# The Refrigeration Service Engineer

JANUARY 1938

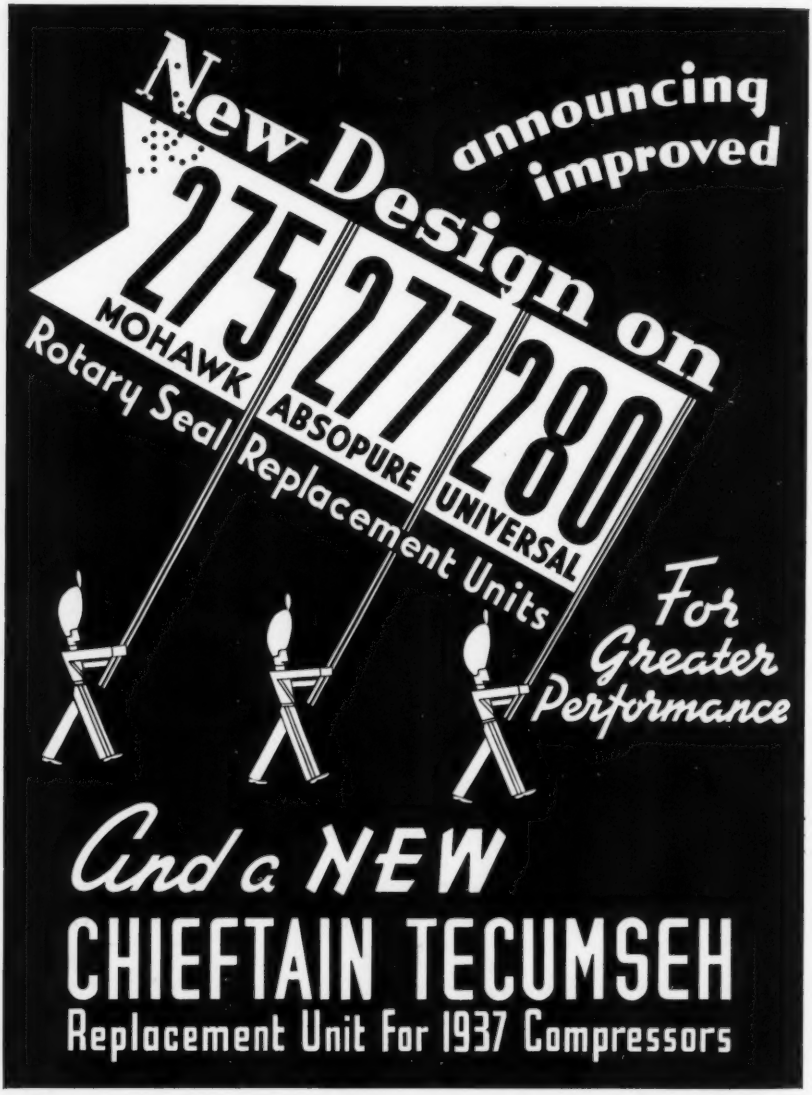
Vol. 8 No. 1

THE JOHN CRERAR LIBRARY JAN 15 1938

SERVICE ANALYZER

NEW TYPE BEER COOLER

AIR CONDITIONING




**ROTARY SEAL COMPANY**

805 W. MADISON STREET, CHICAGO, ILL.

Rotary Seal Replacement Units are fully covered by U. S. and foreign patents.

# BRASS TUBE FITTINGS THAT *are* REFRIGERATOR FITTINGS

**Weatherhead valves and fittings for refrigeration service are built to *refrigeration* standards—not merely adapted automobile fittings.**

**Weatherhead uses hot extruded brass rod. Result—high tensile strength—a higher yield point—fine machine finishing and that square finish which makes installation easy without injury to threads.**

**Write for the new refrigeration catalog which contains a complete listing of refrigeration valves and fittings with their modern features.**

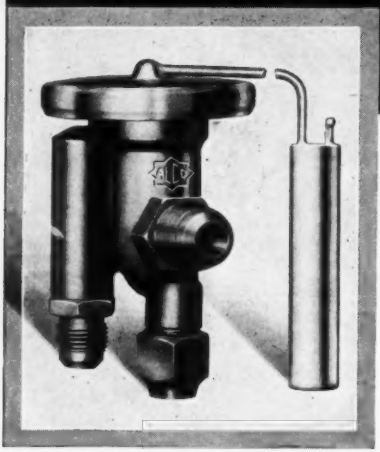
**THE WEATHERHEAD COMPANY**
**CLEVELAND, OHIO**




621.051
R255
634232

# Now You Can Save 20% to 40% on ALCO *Small Capacity* Refrigerant Controls

## With the New "TK" THERMO VALVE



BUILT to traditional Alco standards of accuracy and trouble-free service, the "TK" incorporates all the proven advantages of the established Alco "T" Series Thermo Valves at a material saving in cost. Now Alco offers this high type control at a price within the reach of all small refrigeration and air conditioning systems.

The high type of control that is characteristic of every Alco Thermo Valve is essential if any system is to operate at the highest efficiency. Alco control keeps the line of complete evaporation within the narrowest of limits—utilizing the maximum amount of evaporator surface at all times. The Alco Model "TK" Thermo Valve makes such control available at a moderate price, suitable for small installations.

*Alco filter on right compared to usual size filter.*

***Write Alco or your Alco representative for complete information on the new "TK" Thermo Valve and for details of Alco's Engineered Refrigerant Control Service.***

### *Check these distinctive* ALCO *features of the New "TK" Thermo Valve:*

**1.** Atomic hydrogen welded power assembly that reduces failures to an absolute minimum.

**2.** No bakelite parts—the entire valve will stand full test pressure without injury.

**3.** Large and completely adequate filter area — over 1¾ sq. ins. of filter surface.

**4.** Light weight, simple design—yet as sturdy as all the larger Alco models.

**5.** Available in a variety of line sizes and capacities.

**TYPE TK SPECIFICATIONS**

| Type Valve | Refrigerant | *Capacity | Standard Lengths Capillary Tubing | Size Connections In | Size Connections Out |
|---|---|---|---|---|---|
| | | | | Specify | Requirement |
| TK0F | Freon | .30 | 2′ or 5′ | ¼″ or ⅜″ SAE | ½″ or ⅜″ x ½″ SAE |
| TK1F | | 1.15 | | | |
| TK2F | | 2.50 | | | |
| TK0M | Methyl Chloride | .60 | | | |
| TK1M | | 2.30 | | | |
| TK2M | | 5.00 | | | |

Furnished with Internal Equalizer and External Remote Bulb Only —Outside Adjustment.

*Maximum Tons of Refrigeration with Freon and Methyl Chloride and Under Pressure Differences Between Valve Inlet and Outlet of 60 lb.—Based on 1° Subcooling of Liquid at Valve Inlet.

**ALCO VALVE COMPANY, Inc.**

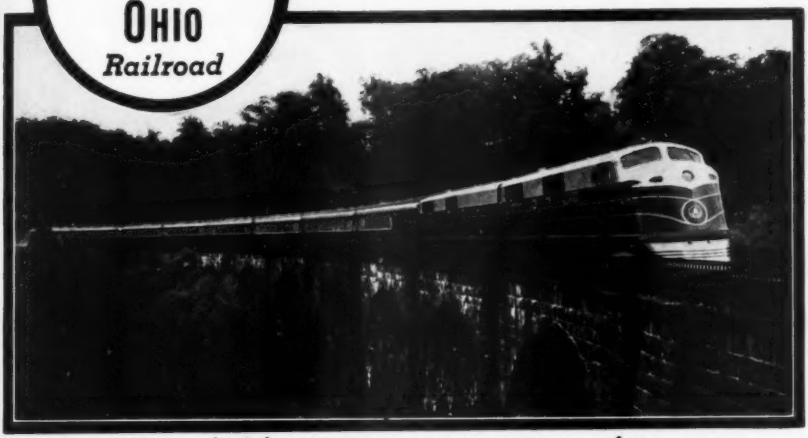
2630 BIG BEND BLVD., ST. LOUIS, MISSOURI

ENGINEERED REFRIGERANT CONTROLS — ALCO — FOR HIGHEST EVAPORATOR EFFICIENCY

**See this valve on the Glass Evaporator at Alco's Booth No. 248-9; International Heating and Ventilating Exposition.**

The BALTIMORE and OHIO Railroad

**Leads in Air Conditioning *for* Comfortable Travel . .**



## The *"Royal Blue"* Latest in B. *and* O. Air Conditioned Streamliners is Equipped with A-P Controls . . . . .

Air Conditioning has done more in the past six years to bring popularity back to Railroad Travel than any other thing. Proof of its growing power is found in the fact that more than 8,000 cars have been Air Conditioned by American Railroads since 1930.

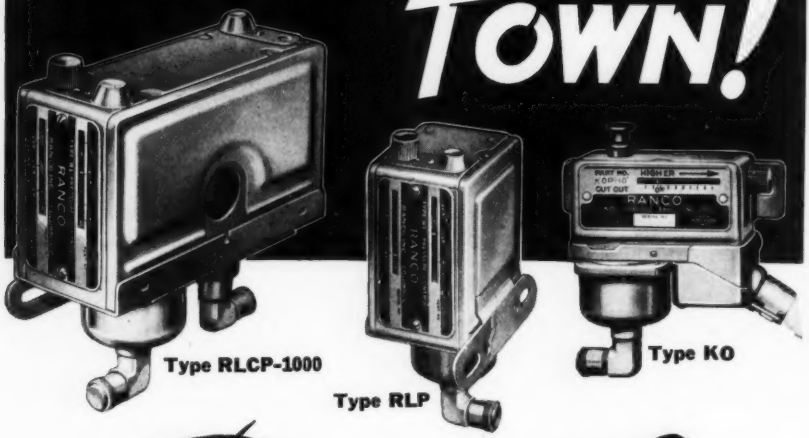
A-P especially salutes B. & O. as the pioneer in Railroad Air Conditioning. The first Air Conditioned Railroad Car put into service in this country was the Martha Washington, equipped by B. & O. in 1930. The first completely Air Conditioned Train used in this country was the B. & O. Columbian, in 1931; and the first completely Air Conditioned long-distance sleeping car train, the National Limited, also of the B. & O., was also equipped in 1932.

The fact that A-P valves are being used by the Baltimore and Ohio Railroad, and operating to complete satisfaction, speaks well for the accuracy, efficiency, and dependability built into these controls.

• *Progressive Jobbers Everywhere Stock A-P Controls*

AUTOMATIC PRODUCTS COMPANY
2454 NORTH THIRTY — SECOND STREET
MILWAUKEE WISCONSIN

# GOING TO TOWN!




# Ranco

## COMMERCIAL CONTROLS

**Are making a big hit with service men everywhere. Type KO, Type RLP and Type RLCP-1000 are especially popular. Find out about them. Write for bulletin. Complete export information furnished on request.**

**Ranco INC., COLUMBUS, OHIO, U S A**

# The Refrigeration Service Engineer

Vol. 6 No. 1

January, 1938

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems and Oil Burners

Official Organ
REFRIGERATION SERVICE ENGINEERS SOCIETY

Published by
Nickerson & Collins Co.
433-435 North Waller Ave.
Chicago
Telephones Austin 1303-1304-1305

EASTERN OFFICE
149 Broadway, New York City
Telephone Barclay 7-8275

Publishers of Technical Books and Trade Journals Serving the Refrigeration Industries for 46 years.

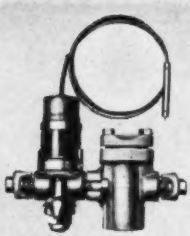
*Subscription Rates United States $2.00 per year. Single copies 25c. All other countries $3.00 per year.*

Copyright, 1938,
by Nickerson & Collins Co., Chicago

## TABLE OF CONTENTS

Service Analyzer, *by D. D. Wile* ..... 7
Air Conditioning Studied in Washington, D. C... 13
A New Type Beer Cooler, *by A. T. Stock* ..... 14
Copeland Purchased by Thompson Interests ..... 16
Air Conditioning (Seventh Article), *by W. C. Farmingdale* ..... 17
The Question Box ..... 20
Display Case Does Not Hold Temperature .... 20
Stuck-up Methyl Compressors ..... 21
Cost of Guarantee Period ..... 22
Changing from Ammonia to Methyl ..... 23
$SO_2$ to Methyl or Freon ..... 23
Heating and Air Conditioning (Fifth Article), *by H. D. Busby* ..... 23
Servicing the McClellan Refrigerating Unit (Fifth Article), *by L. K. Wright* ..... 34
New Mechanical Devices ..... 36
R.S.E.S. News ..... 39
Kansas City Chapter ..... 39
Illinois State Organization Being Discussed .... 39
Indianapolis Chapter ..... 42
Indianapolis Chapter Annual Dinner ..... 44
The "Contrib's Colyum," *by The Kingfish* .... 47
Memphis Ladies ..... 48
Ontario Maple Leaf Chapter ..... 50
Mississippi Valley Chapter ..... 51
Central New York Chapter ..... 52
Missouri Valley Chapter ..... 53
Mississippi Valley Chapter ..... 55
Capital City Chapter ..... 56
Central Indiana Chapter ..... 56
Pittsburgh Chapter ..... 57
Chicago Chapter ..... 58
Manufacturers News ..... 61

DETROIT VALVES WILL *Completely Satisfy* YOUR REQUIREMENTS



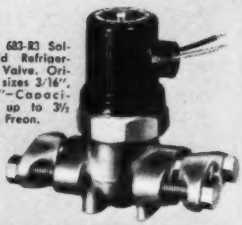
No. 783 Thermostatic Expansion Valve with No. 782 Strainer. Orifice sizes ¼", 5/16"—Capacities up to 10 tons Freon.

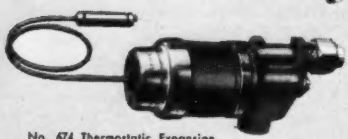
No. 785 Thermostatic Expansion Valve. Orifice sizes 5/16", ⅜"—Capacities up to 20 tons Freon.

No. 781 Thermostatic Expansion Valve. Orifice sizes 3/16", ¼"—Capacities up to 6½ tons Freon.

No. 673 Thermostatic Expansion Valve. Orifice sizes 1/32", 5/64", 5/32", 7/32"—Capacities up to 3½ tons Freon.

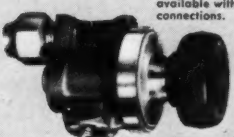
No. 683-R3 Solenoid Refrigerant Valve. Orifice sizes 3/16", 7/32"—Capacities up to 3½ tons Freon.



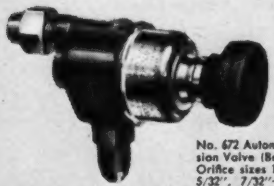


No. 674 Thermostatic Expansion Valve (Non-adjustable). Orifice sizes 1/32", 5/64", 5/32", 7/32"—Capacities up to 3½ tons Freon.

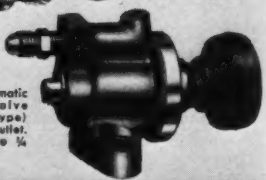
No. 686-R Solenoid Refrigerant Valve (flanged type). Orifice sizes ½", ⅝"—Capacities up to 17 tons Freon. Also available with ½" or ¾" female I.P.T. connections.



No. 676 Automatic Expansion Valve (Diaphragm type) with female I.P.T. outlet. Capacity up to ¼ H. P.



No. 672 Automatic Expansion Valve (Bellows type). Orifice sizes 1/32", 5/64", 5/32", 7/32"—Capacities up to 3½ tons Freon.



No. 676 Automatic Expansion Valve (Diaphragm type) with flanged outlet. Capacity up to ¼ H.P.

DETROIT LUBRICATOR COMPANY

DETROIT, MICHIGAN, U. S. A. • 5900 TRUMBULL AVE.

NEW YORK, N. Y.—60 WEST 42nd ST. • CHICAGO, ILL.—816 S. Michigan Ave.

DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

Canadian Representatives—RAILWAY AND ENGINEERING SPECIALTIES LIMITED: Montreal, Toronto, Winnipeg

The Refrigeration Service Engineer

VOL. 6, NO. 1 CHICAGO, JANUARY, 1938 $2.00 Per Annum

# Service Analyzer*

By D. D. WILE

WHAT would you say is the difference between a refrigeration service engineer and a service mechanic? Wouldn't you agree that the service engineer is somewhat like a trained physician who is capable of diagnosing the ills and ailments of his patient's system? A service mechanic may be highly skilled at making installations and in doing actual service work but if he is not capable of diagnosing trouble he may do more harm than good.

There are generally five steps which you should take in rendering efficient service:

1. *Listen to the complaint.* There is a definite reason why you were called on the job. The customer may think the machine is running too long or giving improper refrigeration. Determine how long the trouble has existed and if it came on slowly or gradually. Don't be afraid to ask questions. The customer is usually pleased to know you are really interested in his complaint. Find out everything you can concerning the complaint.
2. *Analyze the complaint.* Is the trouble due to improper design of the equipment, to misuse, or to something that has recently occurred? Changes in weather or service load may be showing up a design defect which has always existed. Check the things complained about to see that they actually exist.
3. *Check the operation of the system.* Put on gauges and if necessary use thermometers. Feel liquid line, suction line, and evaporator. Keep your eyes open for any sort of unexpected symptom. Is the evaporator completely refrigerated? Is the suction line cold due to refrigerant flooding back? Is there sufficient refrigerant? Has the air flow over the evaporator been obstructed? Is the motor cool showing that it has been running light or hot from hard work?
4. *Analyze the symptoms.* Think of all the possible things that might cause the trouble. The following paragraphs and the service chart will help. Whatever you do, don't go at the job with any fixed notions. Your trouble may be caused by any one of a number of things and it is your business to find which one is at fault. A doctor who removed the appendix every time his patient had a pain in the stomach wouldn't be any worse than the service man who removes the expansion valve every time the suction pressure is wrong.

How many things can you list that will cause high suction pressure or low suction pressure? It would be wise to

* Paper Delivered at 4th Annual Convention, R.S.E.S., Chicago.

have such a list handy at all times.

5. *Correct the trouble.* After you have found a fault and corrected it, make a further check to be sure no additional faults exist. It is not uncommon to find several faults at one time, as for instance shortage of refrigerant, leaking compressor valves and expansion valves out of adjustment. If for any reason you have tampered with the expansion valve adjustment and then found other faults, be sure and readjust the expansion valve back to its proper setting.

### Description of Chart

Probably no list or chart will ever cover all the things that can go wrong with refrigerating systems. The following paragraphs and the "Genuine Detroit" service chart contain practical information based on actual field service. These are not theoretical faults —they have occurred many times in the field.

The column under "Transient Faults" indicates things that go wrong due to failure of equipment. Those listed under "Design Faults" are due to incorrect design or installation. If a system has been operating correctly for a long period then gives trouble it is likely due to a transient fault; however, change in weather or load condition may show up a design fault that has always existed.

After each transient fault and after each design fault is a key number which refers to one of the following paragraphs describing the particular type of fault.

The following paragraphs and chart are particularly for commercial systems using thermostatic expansion valves and controlled by a pressure switch:

1. *Shortage of refrigerant.* A shortage of refrigerant may cause unusual effects depending on other circumstances. On commercial jobs controlled by a pressure switch a slight shortage usually causes the machine to run too long and results in temperatures being colder than normal. However, if the expansion valve is not sufficiently oversize to pass the uncondensed gas the result is a slightly starved evaporator.

Thus, a slight shortage may pass unnoticed except for a higher power bill. A real shortage, of course, causes loss of refrigeration along with either high or low suction pressure, depending on whether the liquid line and the expansion valve are sufficiently oversize to pass the uncondensed gas.

A shortage of refrigerant can be detected by:

A. Liquid line warmer than normal, especially where it enters expansion valve.
B. Head pressure lower than normal. This is not always a dependable indication unless you happen to know what the pressure is supposed to be.
C. Distinct hissing sound at the expansion valve.
D. Sight glasses are the one sure way of detection.

2. *Excess refrigerant.* Excess refrigerant increases head pressure and reduces compressor capacity causing long operation and possibly warm evaporator. May cause damage to motor if it is not properly protected by overload cut-out.

Noncondensible gas in the system may cause this same condition. After blowing out noncondensible gas check for shortage of refrigerant.

Detection:

A. High head pressure.
B. High temperature at compressor discharge, with cold condenser and receiver.

3. *Leaking compressor valves.* Leaking compressor valves cause excessive running time. A slight leak may cause temperatures lower than normal—a bad leak higher than normal.

Detection:

A. When turned over by hand compressor feels weak.
B. When discharge shut-off valve is closed if pressure decreases quickly it indicates leaking discharge valves.
C. Single cylinder compressors will not pump low vacuum and multiple cylinder compressors will not pump vacuum as quickly as usual.
D. Head pressure may be low.

4. *Condenser obstructed.* On commercial jobs and especially unit systems such as ice cream cabinets, the flow of air over the condenser may be obstructed by merchandise stacked around the cabinet. The condenser should be cleaned occasionally to remove dirt accumulation. In certain localities water-cooled condensers must also be cleaned.

5. *Strainer clogged.* Causes starved evaporator and low suction pressure. If strainer is at the condensing unit the liquid line will be cold, due to restriction in strainer. This condition also shows up if liquid line is too small or obstructed.

Detection:

A. Feel liquid line beyond line strainer

# "GENUINE DETROIT" SERVICE CHART

FOR COMMERCIAL SYSTEMS USING THERMOSTATIC EXPANSION VALVES AND CONTROLLED BY PRESSURE SWITCH

| SYMPTOMS | | | | | PROBABLE FAULT | | | |
|---|---|---|---|---|---|---|---|---|
| CONDITION OF JOB | EVAPORATOR CONDITION | RUNNING TIME | SUCTION PRESSURE | SUCTION LINE TEMPERATURE | TRANSIENT FAULTS (Failure of Equipment) | KEY | DESIGN FAULTS (Incorrect Design or installation) | KEY |
| Warm | Warm | Won't Start | Low | Warm | Complete loss of charge<br>Strainer or liquid line clogged<br>Expansion valve lost charge<br>Expansion valve badly out of adjustment | 1<br>5<br>8<br>10 | Compressor located in cold place | 14 |
| Warm | Warm | Continuous | High | Warm or normal | Shortage of refrigerant<br>Too much refrigerant<br>Compressor valves leak<br>Condenser obstructed | 1<br>2<br>3<br>4 | Compressor too small | 15 |
| Warm | Warm | Short cycles or won't start | Low | Normal or cold | Suction line restricted | 17 | | |
| Warm or normal | Starved or) partly ) refrigerated) | Short cycle | Low | Warm | Shortage of refrigerant<br>Strainer or liquid line clogged<br>Expansion valve frozen<br>" " out of adjustment<br>" " lost charge | 1<br>5<br>7<br>10<br>8 | Loss of liquid head<br>Bulb in wrong location<br>Valve in wrong location<br>Liquid line too small<br>Compressor located in cold place | 6<br>11<br>9<br>5<br>14 |
| Warm | Cold | Short cycle | Low | Normal or Cold | Air flow over evaporator obstructed | 13 | Evaporator too small<br>Evaporator surges | 13<br>16 |
| Normal or cold | Flooded | Too long | Normal or high | Flooded | Expansion valve out of adjustment<br>Expansion valve frozen<br>Feeler bulb in poor contact<br>Expansion Valve leaks | 10<br>7<br>11<br>12 | Bulb in wrong location<br>Insufficient drier loop | 11<br>11 |
| Normal or too cold | Cold | Continuous or too long | Normal or low | Normal | Shortage of refrigerant<br>Too much refrigerant<br>Compressor valves leak<br>Condenser obstructed | 1<br>2<br>3<br>4 | Compressor too small | 15 |

to make sure it is not being cooled by pre-expansion.

B. Install gauge in liquid line just ahead of valve and observe actual liquid pressure at valve.

C. Check strainer in valve body to make certain that it is clear.

6. *Loss of liquid head.* When the evaporator is located several floors above the compressor there is a drop in pressure in the liquid line due to the weight of the column of liquid. This pressure loss amounts to 10 pounds for each 18 feet head of Freon, 17 feet head of $SO_2$ and 26 feet head of methyl chloride.

On water-cooled machines where head pressure is usually kept low or on air-cooled machines in cold places the loss in head may retard flow of refrigerant to the evaporator. The result will be low suction pressure and possible starving of evaporator.

Detection:

A. Calculate loss in head using known height of evaporators above compressor and figures given above for various refrigerants.

B. Feel liquid line and observe any tendency to become cold as height increases. This condition may also be caused by undersize liquid line.

C. There is likely to be a hissing sound at expansion valve similar to obstructed liquid line or shortage of charge.

7. *Expansion valve frozen.* This is one of the common reasons for expansion valve failure on methyl chloride and Freon systems. Moisture usually freezes the valve closed and starves the evaporator, but it sometimes freezes it in the open position and causes flooding. A very small amount of moisture in the system can cause a lot of trouble and simply because there is a drier on the system is no assurance that it is dry.

Driers must be fresh and amply large for the system. Furthermore, if the moisture has frozen up in the evaporator or settled under the oil of the crank case it is likely to stay there regardless of the drier. When applying the drier allow the system to warm up and then cycle the compressor by hand so as to circulate the refrigerant while keeping the pressure above the freezing point. It will help to obstruct the condenser during this time. Oil should be drained from the crank case and replaced by a new charge.

It is not at all uncommon for systems to operate for as long as a year without trouble and then suddenly freeze up, the moisture having finally worked out of the evaporator or crank case.

Detection:

A. If compressor is kept off until expansion valve warms up it will then control properly for a short time but may again freeze up. Don't try to heat valve while compressor is operating.

B. Tapping the valve body may cause it to break loose for a while. This is a sure indication of moisture and the only sure way to correct the trouble is to remove the moisture from the system by cleaning out or using a drier. Don't damage the valve by hammering.

C. A small amount of methanol poured into the liquid line may break valve loose temporarily. Don't depend on the methanol—moisture should be removed from the system. Don't use methanol on $SO_2$ systems.

8. *Expansion valve lost charge.* Gradual loss of charge will cause starved evaporator and low suction pressure or short cycling. Complete loss of charge causes valve to close off.

Be sure to check for frozen valve (7), clogged strainer (5) and valve location (9), before removing valve.

Detection:

A. Warming feeler bulb will not affect operation.
*NOTE: This may also be true with clogged strainer or frozen valve.*

B. Allow valve to warm up, then warm feeler bulb and see if valve is open.

C. Remove valve from system and test it on set-up described in latter part of this article.

9. *Expansion valve in wrong location.* If power element on valve becomes colder than feeler bulb it will cause valve to close and starve evaporator. Don't locate the valve directly under the coil or where it will be cooled too much. Capillary tube must also be clear of cold surfaces.

Detection:

A. Warm power element and capillary tube with your hand. If power element is too cold this will temporarily correct trouble. Then rearrange valve location.

10. *Expansion valve adjustment.* The thermostatic expansion valve is probably the most misunderstood part of the refrigerating system. As a matter of fact, its function is extremely simple. *It keeps the coil com-*

*pletely refrigerated.* Always keep that in mind when servicing a system. Adjustment of the valve merely floods or starves the evaporator. Expansion valves seldom change their adjustment of their own accord. When a system which has been operating satisfactorily suddenly changes, the chances are that expansion valve adjustment has not changed but something else has gone wrong. Always check everything else before attempting to adjust the valve. If a small turn does no good it is good assurance that something else is wrong.

Method:

A. Open valve so as to slightly flood evaporator; then turn back until evaporator is completely refrigerated without any flooding over into suction line.

B. Detroit valves are accurately adjusted at the factory so as to maintain the coil completely refrigerated. Valves can be checked in the field by using the test set-up described at the end of this article.

11. *Feeler bulb in wrong location.* Bulb should be clamped to suction line at end of coil and must be unaffected by room temperature. Use sufficient drier tubing between bulb and outside air to prevent heat from flowing into the bulb and forcing the valve open during the shut-down period.

Where several coils connect into a header the connections between bulbs and header must be long enough to prevent one coil from affecting the others.

Where an air current flows over the bulb it should be shielded by wrapping with sponge rubber.

Trouble of this nature often shows up with a change in the outside temperature. An improperly placed feeler bulb may get by unnoticed during mild weather and then cause a flood back during hot weather. Also, the job may be satisfactory during hot weather and an improperly located bulb cause starving of the coil during mild weather.

12. *Expansion valve leak.* The expansion valve should close during the shut-down period. A leaking valve will cause the evaporator to fill up during the off-cycle and flood over at the start of the on-cycle.

Detection:

A. After checking bulb location, adjustment, and possibility of freezing, remove valve and check on test set-up described later.

13. *Evaporator too small.* When evaporator is too small or air flow over evaporator is insufficient, it causes low suction pressure, insufficient refrigeration, long running time and excessive frost.

Detection:

A. Make sure that evaporator is completely refrigerated.

B. Check air flow for obstruction.

C. Check pressure control for proper cut out point.

D. Check load against manufacturer's rating for evaporator.

14. *Compressor location too cold.* Compressors located in open basements may become colder than the fixture being refrigerated. Pressure in the receiver then becomes too low to force refrigerant into evaporator. Pressure switch may not cut-in or if it does evaporator may be starved.

15. *Compressor too small.* Causes long running time or high suction pressure. Always check for other causes that might affect compressor capacity such as leaking valves, obstructed condenser, excess or shortage of refrigerant.

16. *Evaporator surges.* It is now generally recognized that certain evaporators cause refrigerant to surge and give erratic results. Long lengths of large diameter tubing seem to cause most trouble of this type. Display case coils are often of this nature. The slow velocity in such coils permits refrigerant to accumulate and then surge out.

This condition can often be improved or corrected by using an expansion valve with small size orifice. The smaller orifice size prevents over-feeding of refrigerant during the periodic opening and closing of the valve caused by the surges. The small orifice, therefore, tends to smooth out surges on coils which are subject to this type of fault.

Use plenty of drier coil to keep suction line dry.

17. *Suction line obstructed.* It is a common occurrence for ice to form in the clearance space between a copper tube and a flare nut on the end of the evaporator. Continued frost-back may likewise cause freezing to damage joints at other joints along the suction line. After repeated freezing the ice often expands to such an extent that the tube becomes restricted or completely blocked off. Usually the damage is not visible from the outside.

Another form of suction line obstruction which has occasionally occurred is the formation of a solid ice blockade inside the suction line near the evaporator or in the evaporator tube itself. Needless to say, such formation can happen only where an excessive amount of moisture is present.

Any type of suction line obstruction causes the pressure within the evaporator to be higher than the gage reading at the compressor. This condition causes short cycling or if the line is completely blocked off it may prevent sufficient build-up in pressure to start the compressor.

### How to Test Thermostatic Expansion Valves

It often happens that thermostatic expansion valves are removed from installations and returned to the factory as defective when actually there is nothing wrong with them. A large number of valves received at the factory for repairs are in perfectly good operating condition.

It is quite a simple matter to test out these valves in the field, and where this test has been regularly used, it has practically eliminated unnecessary removal and return of valves. In most cases the regular service kit contains all of the necessary equipment. The equipment required is as follows:

1. Service drum full of Freon or Methyl Chloride (in the shop a supply of clean dry air at 75 to 100 pounds pressure can be used in place of the service drum). The service drum is merely for the purpose of supplying pressure and for this reason the refrigerant used does not have to conform with the valve being tested; in other words, a drum of Freon would be perfectly satisfactory for testing with $SO_2$, Methyl Chloride or Freon valves.
2. A high pressure and low pressure gauge. The low pressure gauge should be accurate and should be in good condition so that the pointer does not have too much lost motion. The high pressure gauge is not absolutely necessary but is recommended so as to show the pressure on the inlet of the valve.
3. Fittings and connections are required to complete the hook-up as shown in Fig. 1.
4. A small quantity of finely crushed ice is necessary and one of the most convenient ways of carrying this around is to keep it in a thermos bottle. If such a container is completely filled with crushed ice it will last easily for twenty-four hours. Whatever the container is it should be completely filled with crushed ice. Do not attempt to make this test with the container full of water and a little crushed ice floating around on top.

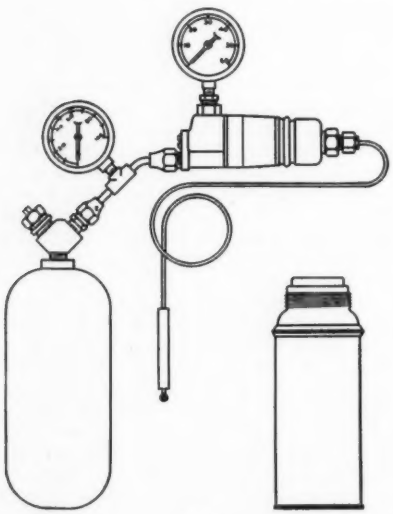


Fig. 1

### Procedure

1. Connect the valve up as shown, with the low pressure gauge screwed slightly loose into the adapter on the expansion valve outlet. The gauge is screwed up loosely so as to provide a small amount of leakage through the threads.
2. Insert the bulb in the crushed ice.
3. Open the valve on the service drum and be sure that the drum is warm enough to build up a pressure of at least 70 pounds on the high pressure gauge connected in the line to the valve inlet.
4. The expansion valve can now be adjusted. The pressure on the outlet gauge should be different for various refrigerants as follows:

| | |
|---|---|
| Freon | 22 pounds |
| Methyl Chloride | 15 pounds |
| Sulphur Dioxide | 3 pounds |

These pressures are equivalent to an evaporating temperature of 22 degrees F. and since the crushed ice maintains the bulb at 32 degrees F., there is a difference of 10 degrees, or in other words, the valve adjustment is for 10 degrees superheat.

This has been found desirable for practically all types of installations.

Be sure to have a small amount of leakage through the gauge connection while making this adjustment.

5. Tap the body of the valve lightly with a small wrench in order to determine if the valve is smooth in operation. The needle of the gauge should not jump more than one pound.
6. Now screw the gauge up tight so as to stop the leakage through the threads and determine if the expansion valve closes off tightly. With a good valve the pressure will increase a few pounds and then either stop or build up very slowly. With a leaking valve the pressure will build up rapidly until it equals the inlet pressure.
7. Again loosen the gauge so as to permit leakage through the threads and then remove the feeler bulb from the crushed ice and warm it up with your hand or by putting it in water at about room temperature. The pressure should increase rapidly showing that the power element has not lost its charge. If the pressure does not increase when this is done it is a sign that the power element is dead.

   NOTE: *With the new gas-charged expansion valves the amount of charge in the power element is limited and the pressure will not build up above the specified pressure. This pressure is always marked on the power element and must be considered when testing gas-charged valves.*
8. With high pressure showing on both gauges as outlined in the preceding paragraph, the valve can be tested to determine if the body bellows leaks. This should be done by loosening up the packing nut and using a Halide leak detector to detect the escape of gas. When making this test it is important that the body of the valve have a fairly high pressure on it and also that the gauge and other fittings are screwed up tight so as to eliminate leakage at other points. Leakage can also be detected by the use of oil or soap suds.

### Precautions

1. Be sure that the service drum has liquid in it and is warm enough to build up sufficient pressure. The high pressure gauge used as shown in the diagram will often save a lot of trouble because it will show when there is not enough pressure on the inlet side of the valve. During the winter time especially the service drum may become cold and develop insufficient pressure to make a satisfactory test.
2. Be sure that the thermos bottle or other container is full of finely crushed ice and does not have merely a little ice floating on top of the water.

* * *

## AIR CONDITIONING STUDIED IN WASHINGTON, D. C.

FINDING that a large percentage of air-conditioning plants in public halls, theaters and stores are improperly operated, Health Department experts are considering a requirement that all such operators pass a test for license.

Claude F. Browning, a sanitary engineer of the Health Department staff, revealed that he had found but three operators out of a total of 300 buildings having an adequate knowledge of their work.

The Health Department has called in 40 representatives of air-conditioning manufacturers and laid before them two alternative proposals. One was the establishment of a school for the training of air conditioning operators, and the other whether the District should require the operators to pass a licensing test.

So far, 300 buildings have been tested out of some 4,000 which use air conditioning.

Mr. Browning reported today that in the summer season the temperature of many public halls, stores or other structures having air conditioning are kept at too low a temperature compared with that of the street and that in the colder weather period these buildings are kept too hot and the air too dry. He said health experts say the relative humidity should be around 30 per cent and that he has found in Washington buildings in the winter a condition as low as 10 per cent, with an average between 22 and 25 per cent. Very few had a relative humidity as high as 30 per cent. One department store last summer was found to have a temperature 24 degrees below that on the streets.

The Health Department agents have not been directed to investigate the effects of air conditioning plants in private residences, but Mr. Browning said he questioned the operation of these since the general instructions given householders were to keep all the windows closed at night. He added there was always a possibility that mechanical equipment might break down leaving the sleeping residents without pure air.

# A New Type Beer Cooler

## Its Principle of Operation and Construction as Described by Its Inventor

By A. T. STOCK *

NUMEROUS difficulties have arisen with beverage and water coolers effecting the over-all operating efficiency one way or another that the new super dry D-X tends to overcome.

Some of these difficulties are:

(1) In a cooler having a coil that is surrounded by a liquid refrigerant there is a tendency for the liquid to boil violently and splash over into the suction line to the compressor, in the event that a very warm body of liquid-to-be-cooled is passed through the coil. The higher the temperature, the more violently the refrigerant liquid boils.

(2) It also provides a bath that is always active in boiling whether or not beverage is being drawn, because the wall that confines the refrigerant is subject to a constant outside heat pick-up, as is the case with any low side coil or flooded evaporator that might have a liquid refrigerant therein. This, of course, results in unnecessary operation of the compressor as far as a beverage cooler is concerned. However, this is overcome somewhat by thoroughly insulating the confines of the cooler.

(3) An oil separator is usually required with methyl and Freon to aid in reducing the quantity of oil that otherwise gets into the bath and becomes entrapped therein. Troubles encountered by oil-logged coils are well known in the refrigeration field, especially to service men.

In the sweet water or brine-type-bath unit, while it has its advantage of a greater holdover, a loss of efficiency results in having a heat-transfer-lag between the beverage coil and the refrigerant. In this type of system, the refrigerant coil, known as dry expansion, is immersed in the bath, requiring a lower operating back pressure. This condition, of course, is undesirable, especially to the one who is paying the electric bills.

*Refrigeration Engineer, Commercial Coil and Refrigeration Co.

### Higher Operating Back Pressure More Efficient

In starting a cooler having any type of bath, it is first necessary for the specific heat of the liquid used for the bath, to be pumped out before the desired beverage temperature is reached.

The approximate ratio of temperatures would be a 25 degree F. refrigerant, a 32 degree to 34 degree F. bath, for, say, a 40 degree F. beverage. Using Freon this would be approximately 24.5 pounds back pressure (gauge).

In the super dry type D-X, the refrigerant would be approximately 35 degrees F. for a 40 degree F. beverage that would net about 8 pounds higher back pressure. In starting the D-X, the work done until the beverage is cooled to 40 degrees is only the specific heat of the small amount of beverage within the coil. Although instantaneous and gradual, this makes a very rapid cooler in bringing the beverage down to the proper temperature, because the refrigerant is cold the instant it contacts the beverage coil.

In this new cooler, instantaneous cooling is obtained and when the liquid refrigerant valve closes off its supply of refrigerant to the cooler, the cooler becomes in a pumped-down condition and is void of any liquid until called upon to do additional work.

The instantaneous cooling is obtained by allowing the refrigerant to contact the beverage coil direct. The refrigerant upon leaving the liquid control valve is deposited on the beverage coil as the beverage is about to leave the cooler, providing the snappiest possible cooling at this point. The refrigerant, of course, has a much greater capacity for heat pick-up than the heat contained in the beverage to be cooled, and flows downwardly toward the inlet of the beverage coil, absorbing heat from the beverage in a gradual manner instead of a sudden chill such as might occur when a beverage coil is immersed in a bath of brine, or refrigerant.

Using the super dry type principle, the over-all operating costs are at a minimum,

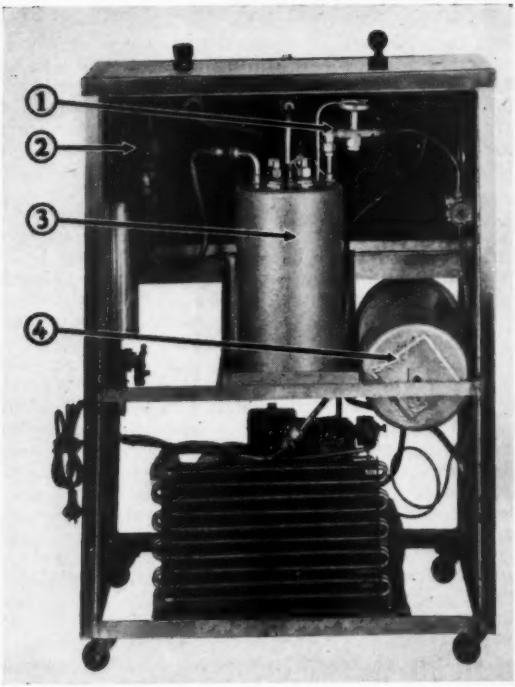
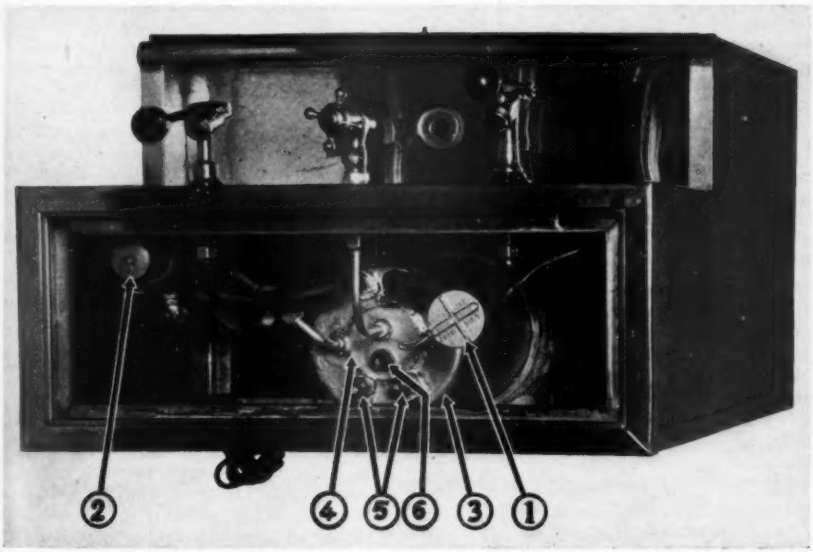



Fig. 1. Rear view of beer cooler, showing (1) the liquid refrigerant control, (2) back pressure control valve, (3) the cooler, (4) the surge tank.

Fig. 2. Below—Top view of beer cooler showing (1) the liquid refrigerant control valve, (2) back pressure control valve, (3) the cooler, (4) the water cooler for bar service, (5) beverage inlets, (6) water inlet.



because there isn't a refrigerant in contact with the wall of the container that would constantly pick up heat causing the compressor to operate during idle periods of the unit. However, intermittent injections of refrigerant maintains the beverage or water within the coil at its proper temperature and in readiness for draught at all times. This super dry type principle also provides for a positive return, to the compressor, of any oil that may be pumped over and conveyed through the system with the liquid refrigerant, without the necessity of providing an oil separator, regardless of the type of refrigerant used.

Its design also eliminates any necessity of having a mechanical insulation surrounding the cooler as tests have shown that the wall of the container that is in contact with the surrounding atmosphere is from 15 to 20 degrees higher in temperature than the temperature of the outcoming beverage. This is due to a gas space acting as an insulator between the outer shell or wall and the liquid refrigerant circuit.

The compactness of the cooler provides for a very neat and clean installation with the shortest possible lines from the cooler to the draught arm or faucets as shown in Figures 1 and 2. This feature reduces to a minimum the amount of beverage stored up in lines from the cooler to the faucets. Its size also permits its installation in all standard bars where, at present, ice or sweet water bath is used for chilling beverages. Also in the case of new bars, it is unnecessary to provide any insulation such as is needed in present day equipment.

### Other Uses of Cooler

Additional uses that this cooler can be adapted to, are for cooling brine for low temperature work used in ice cream cabinets or sharp freezing refrigeration where it is desirable to cool a brine and circulate it through a coil or brine container in a food storage compartment, eliminating the hazards of a refrigerant leak where it may contaminate foodstuffs. In circulating a cold brine of sub-zero temperatures, the outside of the body shows frost on only a few inches at the bottom, the rest of the cooler being above 32 degrees. Also for circulating a sweet water for drinking, or through a cooling chest used for cooling cans of milk on dairy farms and for recooling condensing water used in air conditioning machines.

This type of cooler installed on a dairy farm provided cooling of cans of milk directly from the cow to 50 degrees in less than an hour, as against four hours to 60 degrees by the old method. This colder milk demands a higher price per pound from the pasteurizing plants.

The sweet water cooling is protected in temperatures against freezing by a back pressure valve that is adjustable for temperatures above 40 degrees as may be desired, while for brine temperatures that may be below 32 degrees the temperature may be controlled either thermostatically or by low pressure operating ranges of the switch on the compressor.

It is also stated that liquid at a very high temperature may be passed through the cooler 175 degrees F., water having been used in the process of testing, without causing any boil-over of liquid refrigerant, such as occurs in other types of coolers.

S S S

## COPELAND PURCHASED BY THOMPSON INTERESTS

TWO of the refrigeration industry's oldest names have been linked together by the purchase of controlling interest in the Copeland Refrigeration Corporation by a group headed by Mr. Harry E. Thompson, who is nationally recognized as one of the industry's pioneers, and who becomes president and general manager of the Copeland Company. Completion of the negotiations were announced by Mr. Dallas E. Winslow who has been in control of Copeland for the past four years.

Associated with Mr. Thompson in the management of Copeland will be several of the industry's best-known executives and engineers. These include: Mr. Frank J. Gleason, who will become vice-president in charge of sales; Mr. Charles L. Curtis, who will be named vice-president in charge of production; and Mr. Oskar H. Buschmann, who will be the chief engineer.

A number of Copeland executives who have long been identified with the company will remain with the new organization, including W. G. vonMeyer, sales manager, and E. C. Burr, treasurer.

Acquisition of stock control of the corporation by the Thompson group comes on the heels of the recent removal of the Copeland plant from Detroit to Sidney, Ohio, where manufacturing operations are now well under way, including production of domestic refrigerators and commercial units.

*Seventh Article*

# Air Conditioning

## Proper Size Refrigerant Lines

*By* W. C. FARMINGDALE

IN the December article, a suction line table was given which showed the capacity in Btu per hour for various lengths of different size copper tubing. At the time this table was prepared, data on ¼ inch copper pipe was not available. Since then this table has been revised to include ¼ inch hard drawn copper pipe. It is suggested that service engineers who have placed the former table in their scrap books, destroy that table and replace it with this more complete one.

Continuing on with our study of how to use this table for complex multiple installations, let us consider Fig. 1.

Branch A is the longest branch so let us size it first. The total length of Branch A is (starting at the refrigerating machine) 20 feet + 40 feet + 40 feet + 20 feet = 120 feet. Hence, *all our line sizes must be selected from the 120 foot line in Table 1.* In the previous article, we pointed out that in using Table 1, all line sizes for any branch must be selected from that line which corresponds with the distance between the refrigerating machine and the furthest cooling coil. If this precaution is not taken, a pressure drop greater than 2 pounds will exist between the furthermost unit and the refrigerating machine.

Getting back to our problem then, let us size Branch A starting at the refrigerating machine. The first 20 foot run of piping carries the gas of both Branch A and Branch B. Hence, this 20 foot run will carry 4,000 + 5,000 + 10,000 = 19,000 Btu from Branch B and also 12,000 + 6000 + 10,000 = 28,000 Btu from Branch A. Thus the first 20 foot run will carry 19,000 + 28,000 = 47,000 Btu.

Now from the 120 foot line in Table 1 we find that 1⅜ inch pipe will carry only 38,000 Btu so this is too small and we must use 1⅝ inch pipe which has a capacity of 60,000 Btu.

Proceeding to the 40 foot section of Branch A, we find that this section must carry the entire load of Branch A or

12,000 + 6,000 + 10,000 = 28,000 Btu.

From Table 1 on the 120 foot line we find that 1⅛ inch pipe will carry only 22,500 Btu and so we should select 1⅜ inch pipe for this section.

The second 40 foot section will carry

6,000 + 10,000 = 16,000 Btu.

From the 120 foot line in Table I, we would

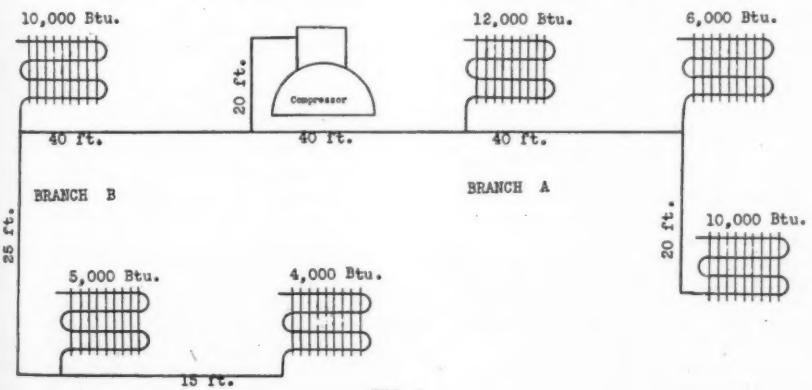



FIG. 1.

TABLE I. CAPACITY OF F12 SUCTION LINES FOR AIR CONDITIONING.

Refrigerant Temperature 40 Degrees F.; Total Pressure Drop 2 Pounds; Gas Velocity 1,000 Feet per Minute. Average Number of Fittings.

| Distance in Feet Between Machine and Cooling Coil. | Outside Diameter of Copper Pipe. | | | | | | |
|---|---|---|---|---|---|---|---|
| | 5/8" | 3/4" | 7/8" | 1 1/8" | 1 3/8" | 1 5/8" | 2 1/8" |
| | B.T.U. Capacity per Hour. | | | | | | |
| 20 | 11,000 | 17,000 | 25,000 | 50,000 | 85,000 | 120,000 | |
| 40 | 8,800 | 14,000 | 20,000 | 40,000 | 70,000 | 105,000 | |
| 60 | 7,500 | 12,000 | 17,000 | 35,000 | 60,000 | 100,000 | |
| 80 | 6,200 | 10,000 | 13,000 | 30,000 | 50,000 | 78,000 | |
| 100 | 5,000 | 8,000 | 12,000 | 25,000 | 43,000 | 68,000 | 130,000 |
| 120 | 4,500 | 7,500 | 10,500 | 22,500 | 38,000 | 60,000 | 115,000 |
| 140 | 3,750 | 6,000 | 10,000 | 20,000 | 34,000 | 50,000 | 100,000 |

select 1 1/8 inch pipe for this run.

The last 20 foot run carries 10,000 Btu. For this run we would select 7/8 inch tubing.

Branch A is now completely sized. Continuing with Branch B, the total length of this branch is (starting at the refrigerating machine) 20 feet + 40 feet + 25 feet + 15 feet or 100 feet. Hence, all line sizes on Branch B will be selected from the 100 foot line in Table I.

The 20 foot run from the refrigerating machine is common to both Branch A and to Branch B. This section was completely sized as the first step in sizing Branch A (the longest branch). 1 5/8 inch pipe was chosen for this run.

The first 40 foot run in Branch B carries the entire load of this Branch or:

4,000 + 5,000 + 10,000 = 19,000 Btu.

From the 100 foot line in Table 1, we find that 1 1/8 inch pipe has a capacity of 25,000 Btu. Hence, we would select 1 1/8 inch pipe for this first 40 foot run.

The next 25 foot run will carry:

4,000 + 5,000 = 9,000 Btu.

Therefore, from the 100 foot line in Table 1 we would select 3/4 inch pipe which has a capacity of 8,000 Btu.

The last 15 foot run will carry only 4,000 Btu. so from the 100 foot line in Table 1 we would select 5/8 inch tubing for this section. This completes our sizing of both branches.

Now let us go back over our work and see if we have an excessive capacity in our line which might make our suction line over costly. To do this let's make up a table such as Table 2. In this table we will note the line sizes we used, the capacity they afford and also the capacity we ought to have to carry the load.

In examining Table 2, on Branch A, we find that on the first 40 foot run, we have an excessive capacity of 10,000 Btu. On the second 40 foot run we have an excess capacity of 5,500 Btu and on the 20 foot run an excess of 500 Btu. Now if we should use an 1 1/8 inch pipe in place of the 1 3/8 inch pipe on the first run, we would be 5,500 Btu under size on this run. However, our excess capacity on the common 20 foot run and on the other 40 and 20 foot runs on Branch A, would easily make up for this shortage of 5,500 Btu. Therefore, we could safely use 1 1/8 inch pipe for our first 40 foot run in Branch A.

TABLE 2. BRANCH A.

| Run. Feet | Size Pipe | Btu Required | Btu Selected | Excess Btu |
|---|---|---|---|---|
| 20 | 1 5/8" | 47,000 | 60,000 | 13,000 |
| 40 | 1 3/8" | 28,000 | 38,000 | 10,000 |
| 40 | 1 1/8" | 16,000 | 22,000 | 5,500 |
| 20 | 7/8" | 10,000 | 10,500 | 500 |
| | | Branch B. | | |
| 40 | 1 1/8" | 19,000 | 25,000 | 6,000 |
| 25 | 3/4" | 9,000 | 8,000 | 1,000 |
| 15 | 5/8" | 4,000 | 5,000 | 1,000 |

On examining Table 2, we find in Branch B we have only a 6,000 Btu excess capacity and so we can't cut down on the pipe size of this Branch.

So, we would revise our original sizing to appear as in Fig. 2.

**Special Consideration in Laying Out Suction**

There are a number of factors that must be taken into consideration in laying out suction lines. Among these, two are outstanding:

1. Number of fittings or bends in the suction line.

2. Oil traps in the suction line.

Either a large number of fittings in the suction line or an oil trap, tends to increase the pressure drop in the suction line and reduces the carrying capacity of the line.

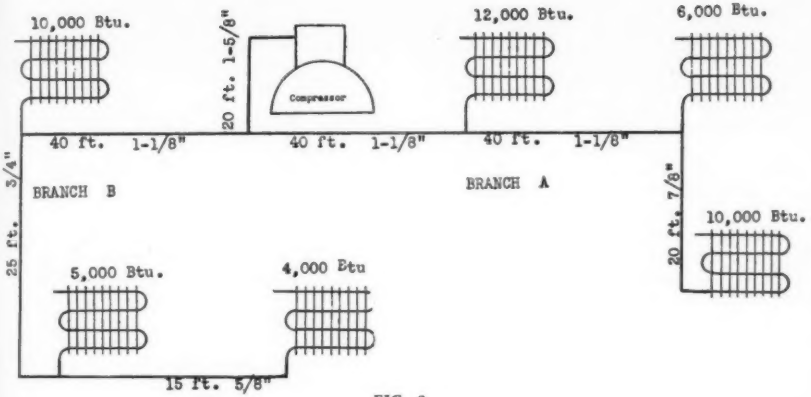



FIG. 2.

### Excessive Number of Fittings

In air conditioning work, especially where the unit system of conditioning is employed, the suction line can seldom be run in a straight line from the refrigerating machine to the conditioning unit. Rather, the refrigerant lines must run along the baseboard in the room from unit to unit. Since most conditioners sold today supply fresh air, the conditioners must be located along outside walls. In large buildings, invariably there are columns along the outside wall which project into the room anywhere from 3 to 18 inches and they are spaced from 6 feet to 18 feet apart. This means that in running refrigerant lines along the outside walls, at least four elbows must be used to carry the suction line around each column, and since each elbow creates a slight restriction to the flow of gas through the line, a large number of fittings will materially reduce the capacity of the suction line. Table 1 is based on average installation conditions where no more than 20 fittings are used in 100 feet. In case the number of fittings exceeds 20 per 100 feet and the excess capacity in the suction line as chosen from Table 1 is lower than 10 percent, use the next larger size pipe.

### Oil Trapped Suction Lines

If suction lines are not laid out carefully and installed just as carefully, the system will not produce the cooling effect it was designed to do. This happens when oil traps are allowed to form in the suction line. Oil collects in these traps and cuts down the effective size of the suction lines. (See Fig. 3.)

Not only does an oil trapped line cause the system to have too small a capacity, but since a considerable amount of oil will always lie in the oil trap, there is real danger that the compressor will run short of oil and either stick up or scorch the cylinder walls and the crankshaft bearings. It is of extreme importance that the suction line be installed properly.

On commercial refrigerators, little trouble is experienced from oil trapped suction lines, because the cooling coils are always higher than the compressor. Oil can drain from the cooling coil back to the compressor by gravity.

However, a different condition exists in air conditioning. Here the cooling coils are usually located on the same level as the refrigerating machines and often the refrigerating machines are located outside the rooms on roofs higher than the floor of the room.

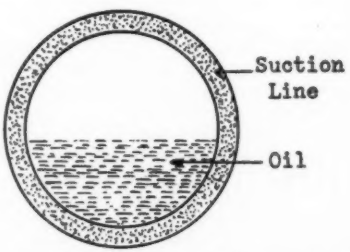



Fig. 3. Shows how oil trapped in the suction line cuts down the effective size of the suction line.

Where possible, the suction line of air conditioners should slope from the conditioners to a point near the refrigerating machine and the suction line should not sag at any point throughout its run.

This means that there will be a bad oil trap on the floor near the refrigerating machine just before the suction line rises vertically from the floor to the suction valve on the refrigerating machine.

This trap can be effectively eliminated by using a 6 foot length of pipe one size smaller than the normal suction line size at this trap, along the floor for several feet and for the vertical riser, up to the suction valve on the compressor.

Now just what effect will the use of a smaller size pipe have on the oil trap? By decreasing the diameter of the horizontal part of the suction line, we speed up flow of the refrigerant gas through this section of our line. If oil is lying in the line, the rush of gas over the oil will pick it up and carry it up the vertical riser into the suction part of the compressor.

But, you'll say, why reduce the pipe diameter? Won't the oil lying in the oil trap effectively reduce the pipe diameter and automatically cause the suction gas to scrub the oil back into the compressor?

Yes, that would work too. But how do we know how much oil will be retained in the trap? It may take several weeks of operation before a normal amount of oil will collect in the trap. That means then that the compressor may run dry before our suction line oil return system will start to function. Hence, it is better practice to install this sort of a Venturi oil return system.

Occasionally it may be necessary to run the refrigerant lines around a doorway. *Except in extreme cases, the lines should be carried under the floor and not over the door.* In installing lines under the door way where an oil trap will be created, it is a good plan to install a Venturi as described above.

When lines must be installed over a door way, drop the suction line one pipe size for about 6 feet before the doorway and also to the top of the door. Then increase the pipe size to normal on the top and down runs of the pipe. In case the pipe size for that particular run (as chosen from Table 1) has an excessive capacity, drop the pipe size 2 sizes on the vertical run up to the top of the doorway. Then increase the pipe size to normal on the top and down runs on the doorway.

? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ?

# The Question Box

**Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment as well as oil burners to "The Question Box."**

? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ?

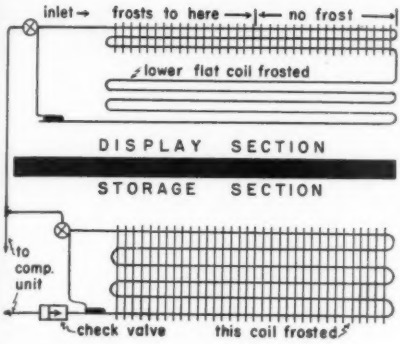
## WE WOULD LIKE TO KNOW

*Though many questions have been answered and suggestions made through this department, relative to the correction of peculiar cases of trouble, the editor is seldom accorded the pleasure of learning the final outcome of the difficulty.*

*We would be very interested in learning some of the details after the trouble has been corrected. Won't you please write and let us know how the suggestions worked out, or how the difficulty was finally overcome, referring, if possible, to the original number, or any other identification of the question?*
—EDITOR.

## DISPLAY CASE DOES NOT HOLD TEMPERATURE

**QUESTION 235. The information I am seeking is in connection with a 12 foot "Dry-Kold" display case, with a storage compartment in the bottom. It is equipped with a Williams Ice-O-Matic ½-hp. high side. The refrigerant controls are two Detroit No. 673 thermostatic expansion valves. The coil in the lower compartment is equipped with an Imperial check valve in the suction line. There is a finned coil in the back of the display section in series, with another coil without fins, which is placed on the bottom. The storage section has a large finned coil**




mounted on the front of that compartment.

The storage coil frosts completely. The display coil (finned section) frosts about half-way—the other end at no time having frost on it. The plain tube section in series with it frosts. The frosted sections do not defrost during the off-cycle.

System uses methyl. At 70 degrees room temperature, the low pressure gauge reads 13.5 lbs.—the high pressure 114 lbs.

When case was sold and installed, owner was told that it would maintain about 42 degrees in top and 32 degrees in storage section. Pressure control trips on at 25 lbs.—off at 8 lbs. It is a Penn control.

What pressures would you recommend for the expansion valves and control? According to the chart in the April, 1936 issue of THE REFRIGERATION SERVICE ENGINEER, the gas charge is low. How much would you add?

ANSWER: From your description, the most outstanding thing that comes to my attention is the fact that the coils are frosting and do not defrost during the off-cycle, and I take it for granted since this is the condition that the temperature in the cabinet is too high. You have not stated so, but this is usually the natural following in such cases.

Finned coils are always designed to operate in what is called a defrost cycle. In other words, they will frost lightly during the operating period, and defrost during the idle period of the cycle. I would suggest that you set the pressure control to cut-in at not lower than 27 lbs. and cut-out at not lower than 10 lbs. This, I believe, will overcome the continuous frosting of the coils.

I see no indication of the system being short of gas, and believe you have sufficient in it to operate properly.

## STUCK UP METHYL COMPRESSOR

QUESTION 236. About four days ago, I was called in the night for a methyl chloride machine that had stopped. I found the compressor to be stuck, opened it up, and loosened the connecting rod when it turned perfectly free. I then tightened the rods up as they were before, put in new oil (Texaco Capella "B" which was the only thing available at 3 o'clock in the morning). The machine ran four days and stuck up again. This time it had to be completely disassembled to free it, as the bearings, pistons and cylinders were covered with a gummy substance, quite like tar. I took my troubles, via telephone, to a serviceman in a neighboring city, and was informed that the oil was wrong—that it should have been Texaco Capella "D," which I learned was made especially for use with methyl. I sent a man to this neighboring city for the proper oil, and he returned with some Kelvinator oil in a sealed container, on which was printed "for use with sulphur, methyl or Freon" which makes the situation more puzzling to me. I cleaned it all up and added the new Kelvinator oil, and turned it loose, but don't know how long it will keep going.

One thing which might cause the trouble is that the machine is carrying quite an overload, and runs much too hot, and is "hopped up" with methyl until the head pressure is 25 percent or more above normal, as per the chart given on page 7, April, 1936, issue of THE REFRIGERATION SERVICE ENGINEER. Whether this condition would cause our trouble or not, I don't know. This machine is about a year and one-half old, has done a lot of running, and outside of blowing out a head gasket and having methyl added twice, it has had nothing done to it, and had the original charge of oil when it stopped a few days ago.

ANSWER: Your trouble is a comparatively rare one with methyl chloride systems. It is usually found in machines that are well overloaded, causing them to run almost continuously and at a high temperature and head pressure.

The condition is not due to the kind of oil used, since it may happen with any grade of oil. I don't mean to say by this statement that it is not important to use the proper grade of oil. It is for other reasons very important, and the oil should be between 300 and 320 viscosity.

The trouble is caused by the oil in solution with the methyl, and possibly with moisture present, striking the hot parts of

the compressor. The increased heat of the compressor increases the gummy deposits. I had one such case in my own experience where we completely cleaned and overhauled the high side and reinstalled. The machine ran for about two weeks and gummed up again. This time I found it necessary to disassemble the entire system, including the evaporator coils, and clean all the way through. Apparently the oil that had circulated with the gas during operation had carried some of the gummy deposits to the evaporator. When the machine was started again, after overhauling, these deposits were carried back to the compressor, causing it to gum up again. If you experience this trouble again with the machine in question, I would suggest cleaning the entire system and replacing the oil.

## COST OF GUARANTEE PERIOD

**QUESTION 237. (1) What percentage of the selling price of the average domestic cabinet is set aside to cover installation and service during the guarantee period?**

**(2) Does the average dealer break even, save money, or lose money on this service?**

**(3) In your estimation, should the dealer be able to save some of this money set aside for service? If so, what percent?**

**(4) What do you think are the weak spots in the average service department—call-backs due to inadequate service, service required due to improper installation, or what?**

ANSWER: I have never heard of any set percentage of the selling price which is set aside to take care of the guarantee service period. I don't believe this could be based on percentage anyway, due to the fact that the service cost on a four or six cubic foot cabinet is practically the same, while the selling price of each is considerably different.

The amount set aside is usually a flat amount and may vary for the first, second and third years on an increasing scale. Rates will probably not run less than four, five and six dollars for the first, second and third years, and will vary from these amounts in accordance with the particular dealer's experience. I recall the statement of an executive of one large, well-known dealer selling a line of private brand refrigerators, who claimed it was necessary to set aside seven, nine and ten dollars for the first, second and third year's service; others I have heard of vary over a large range of costs.

The amount set aside for this purpose is usually designed to break even as nearly as possible, and in starting out, the dealer will usually put aside an estimated amount per installation, based on the manufacturer's experience, or on the experience of other dealers whose information is available to him, and after sufficient experience has been gained, his figures will be changed according to his own costs. As you can easily see, this amount will vary considerably in accordance wtih their particular set-up and efficiency, and possibly with the class of equipment and conditions worked with.

In my estimation, the dealer should not try to make money out of his service. The majority of dealers are concerned primarily with selling, and service to them is merely a necessary evil to this end. The department should be able to pay for itself, and accumulate a sinking fund sufficiently large to take care of depreciation of tools and equipment. It should also be charged with overhead proportioned to the floor space it occupies, where this department is in the same building as the sales department. Further than this, there is no point in increasing the amount set aside by the sales department for service merely to have this service department return a profit over and above its cost.

### The Weak Points

"Call-backs" are most certainly a weak spot to all service departments, and to a large extent apparently cannot be avoided. In commercial refrigeration, the care taken in installation undoubtedly has a large bearing on the calls received during the guarantee period and later. Engineering and design of the system, of course, will be another big factor. In household cabinets, however, which are shipped in one compact unit, the location of the cabinet would be the only installation factor governing service.

At least 18% call-backs can be expected in almost any service department due to things beyond its control, and may only be reduced by a good dispatcher, who upon receiving the call from the customer, is sufficiently well posted to be able to "weed out" the useless requests and explain to the customer's satisfaction over the phone.

This percentage may increase due to inefficiency of the serviceman, poor equipment, or to many other conditions.

These, of course, are mostly my own experiences and views. The questions are in-

teresting ones, and perhaps readers of this journal will be interested in expressing their findings through this column. I believe some very useful data could be accumulated in this way.

## CHANGING FROM AMMONIA TO METHYL

**QUESTION 238. I have a party who has a 2-hp. ammonia compressor, operating on a finned coil in a 10'x10' walk-in cooler. This is a meat market installation. This finned coil is made out of one inch tubing.**

**He wants to change over to a sulphur dioxide or methyl chloride air-cooled job, using the same coil. How would you suggest cleaning this coil to remove all ammonia? Would this coil work satisfactorily on $SO_2$ or $CH_3CL$?**

**This change-over would have to be done in a very short time, as he can't be without refrigeration. I prefer using a 1-hp. methyl chloride air-cooled compressor.**

ANSWER: I agree that a methyl chloride system would be of greater advantage in this change-over than $SO_2$, and providing the 10x10 walk-in cooler is of average construction, the 1-hp. air-cooled unit should handle it very satisfactorily.

I see no reason why the finned ammonia coil should not work perfectly okay in conjunction with the new machine. In order to clean this coil of ammonia, I would suggest as the quickest way that you thoroughly blow it through with carbon dioxide ($CO_2$) or as a last resort, if you have no $CO_2$ available, use strong pressure of methyl chloride gas to blow it through. The most important part of this procedure would be to be sure of removing all of the old oil which would contain ammonia from the coil, and I believe that using high pressure to blow it through will do this job satisfactorily.

I take it for granted since this is a finned coil that it is galvanized inside and out, and you will, therefore, not have any rust to contend with.

The only further suggestion I might make, which is one you no doubt are thoroughly familiar with, is that the inlet to the coil be connected at the top, the outlet at the bottom, assuring yourself of a dry expansion system rather than a partially flooded system.

## $SO_2$ TO METHYL OR FREON

**QUESTION 239. Could you tell us if we are liable to run into any trouble from corrosion, moisture, or anything else in changing an $SO_2$ condensing unit over to a Freon? We have reference to a Frigidaire air-cooled ¾-hp. $SO_2$ job, which has a 1-hp. motor on it, which has the same bore and stroke as their 1-hp. Freon job, and we would like to change this job over to get the added efficiency possible with Freon. Or, would you recommend changing it to methyl chloride, with which we know there are no ill effects in mixing with any trace of $SO_2$ which might be left in the system.**

ANSWER: In changing over a condensing unit from $SO_2$ to Freon, no trouble would be experienced apart from possibly the necessity of increasing the spring tension on the seal to take care of the increased crankcase pressure during operation, and, of course, to increase the size of the motor, which is necessary to take care of the increased capacity of the unit.

Either methyl chloride or Freon, as you wish, will be equally suitable. Neither of these gases are troubled with corrosion, due to moisture, or to the possibility of small amounts of $SO_2$ being present.

I cannot recall at this time, the particular type of seal used on the unit mentioned in your letter, but as a general rule for Freon or methyl, the spring tension on the seal should be increased to about 75 lbs. This may be done on some types of seals by adding washers to the thickness of about ⅛ inch. However, as stated before, I am not sure whether that will apply to the unit you have in mind.

* * *

# Heating and Air Conditioning

## *Chapter 3—Continued*

*By* H. D. BUSBY

HERE is the balance of the tables covering the coefficients of transmission through frame interior walls, frame floors and ceilings, concrete floors and ceilings, concrete floors on the ground, flat roofs, pitched roofs, windows, skylights and doors.

The complete set of tables, from Tables 2 to 13, inclusive, cover all the types of construction commonly found in buildings.

In the February issue, we will discuss the Degree Day.

## TABLE 6. COEFFICIENTS OF TRANSMISSION ($U$) OF FRAME INTERIOR WALLS AND PARTITIONS[a]

*Coefficients are expressed in Btu per hour per square foot per degree Fahrenheit difference in temperature between the air on the two sides, and are based on still air (no wind) conditions on both sides.*

| TYPICAL CONSTRUCTION | WALL No. | SINGLE PARTITION (FINISH ON ONE SIDE OF STUDDING) | DOUBLE PARTITION (FINISHED ON BOTH SIDES OF STUDDING) | | | | |
|---|---|---|---|---|---|---|---|
| | | | Air Space Between Studding | Flaked Gypsum Fill[b] Between Studding | Rock Wool Fill[b] Between Studding | ½-in. Flexible Insulation Between Studding (One Air Space) | Stud Space Faced One Side with Bright Aluminum Foil |
| TYPE OF WALL | | A | B | C | D | E | F |
| **Wood Lath and Plaster** On Studding | 77 | 0.62 | 0.34 | 0.11 | 0.076 | 0.21 | 0.24 |
| **Metal Lath and Plaster**[c] On Studding | 78 | 0.69 | 0.39 | 0.11 | 0.078 | 0.23 | 0.26 |
| **Plaster Board** (⅜ in.) **and Plaster**[d] On Studding | 79 | 0.61 | 0.34 | 0.10 | 0.075 | 0.21 | 0.24 |
| ½ in. **Rigid Insulation and Plaster**[d] On Studding | 80 | 0.35 | 0.18 | 0.083 | 0.063 | 0.14 | 0.15 |
| 1 in. **Rigid Insulation and Plaster**[d] On Studding | 81 | 0.23 | 0.12 | 0.066 | 0.054 | 0.097 | 0.10 |
| 1½ in. **Corkboard and Plaster**[d] On Studding | 82 | 0.16 | 0.081 | 0.052 | 0.044 | 0.070 | 0.073 |
| 2 in. **Corkboard and Plaster**[d] On Studding | 83 | 0.12 | 0.063 | 0.045 | 0.038 | 0.057 | 0.059 |

[a]Computed from factors marked by * in Table 2.
[b]Thickness assumed 3⅝ in.
[c]Plaster on metal lath assumed ¾-in. thick.
[d]Plaster assumed ½-in. thick.

## TABLE 7. COEFFICIENTS OF TRANSMISSION ($U$) OF MASONRY PARTITIONS[a]

*Coefficients are expressed in Btu per hour per square foot per degree Fahrenheit difference in temperature between the air on the two sides, and are based on still air (no wind) conditions on both sides.*

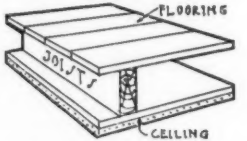
| TYPICAL CONSTRUCTION | No. | PLAIN WALLS (NO PLASTER) | WALLS PLASTERED ON ONE SIDE | WALLS PLASTERED ON BOTH SIDES |
|---|---|---|---|---|
| TYPE OF WALL | | A | B | C |
| **4-in. Hollow Clay Tile** | 84 | 0.45 | 0.42 | 0.40 |
| **4-in. Common Brick** | 85 | 0.50 | 0.46 | 0.43 |
| **4-in. Hollow Gypsum Tile** | 86 | 0.30 | 0.28 | 0.27 |
| **2-in. Solid Plaster** | 87 | ..... | ..... | 0.53 |

[a]Computed from factors marked by * in Table 2.

Copyright, American Society of Heating and Ventilating Engineers—From A.S.H.V.E. Guide.

## TABLE 8. COEFFICIENTS OF TRANSMISSION ($U$) OF FRAME CONSTRUCTION FLOORS AND CEILINGS[a]

*Coefficients are expressed in Btu per hour per square foot per degree Fahrenheit difference in temperature between the air on the two sides, and are based on still air (no wind) conditions on both sides.*

| TYPICAL CONSTRUCTION | INSULATION BETWEEN JOISTS | No. | TYPE OF FLOORING | | | | |
|---|---|---|---|---|---|---|---|
|   | | | No Flooring | Yellow Pine Flooring[b] on Joists | Yellow Pine Flooring on Rigid Insulation (½ in.) on Joists | Maple or Oak Flooring[c] on Yellow Pine Sub-Flooring[b] on Joists | ¼-in. Battleship Linoleum on Yellow Pine Flooring[b] |
| TYPE OF CEILING | | | A | B | C | D | E |
| **No Ceiling** | None | 1 | ..... | 0.46 | 0.27 | 0.34 | 0.34 |
| **Metal Lath and Plaster** (¾ in.) | None | 2 | 0.69 | 0.30 | 0.21 | 0.25 | 0.25 |
| **Wood Lath and Plaster** | None | 3 | 0.62 | 0.28 | 0.20 | 0.24 | 0.24 |
| **Plaster Board** (⅜ in.) **and Plaster** (½ in.) | None | 4 | 0.61 | 0.28 | 0.20 | 0.24 | 0.23 |
| **Rigid Insulation** (½ in.) **and Plaster** (½ in.) | None | 5 | 0.35 | 0.21 | 0.16 | 0.18 | 0.18 |
| **Metal Lath and Plaster** | **Flexible[d] Insulation** (½ in.) | 6 | 0.24 | 0.16 | 0.13 | 0.15 | 0.15 |
| **Metal Lath and Plaster** | **Rigid Insulation[d]** (½ in.) | 7 | 0.26 | 0.17 | 0.14 | 0.15 | 0.15 |
| **Metal Lath and Plaster** | **Bright Aluminum Foil[e]** | 8 | 0.59 | 0.22 | 0.17 | 0.19 | 0.19 |
| **Metal Lath and Plaster** | **Rock Wool Fill** (3½ in.) | 9 | 0.079 | 0.068 | 0.063 | 0.066 | 0.066 |
| **Corkboard** (1½ in.) **and Plaster** (½ in.) | None | 10 | 0.16 | 0.12 | 0.10 | 0.11 | 0.11 |
| **Corkboard** (2 in.) **and Plaster** (½ in.) | None | 11 | 0.12 | 0.10 | 0.087 | 0.094 | 0.094 |

[a] Computed from factors marked by * in Table 2.

[b] Thickness assumed to be 25/32 in.

[c] Thickness assumed to be 13/32 in.

[d] Based on one air space with no flooring, and two air spaces with flooring. The value of $U$ will be the same if insulation is applied to under side of joists and separated from lath and plaster ceiling by 1-in. furring strips.

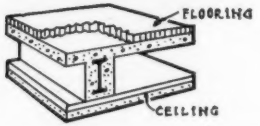
[e] Air space faced on one side with bright aluminum foil.

Copyright, American Society of Heating and Ventilating Engineers—From A.S.H.V.E. Guide.

Copyright, American Society of Heating and Ventilating Engineers—From A.S.H.V.E. Guide.

## TABLE 9. COEFFICIENTS OF TRANSMISSION (*U*) OF CONCRETE CONSTRUCTION FLOORS AND CEILINGS[a]

*Coefficients are expressed in Btu per hour per square foot per degree Fahrenheit difference in temperature between the air on the two sides, and are based on still air (no wind) conditions on both sides.*

| TYPICAL CONSTRUCTION.   | Thickness of Concrete (Inches) | No. | TYPE OF FLOORING | | | | |
|---|---|---|---|---|---|---|---|
| | | | No Flooring (Concrete Bare)[b] | Yellow Pine Flooring[c] on Wood Sleepers Embedded in Concrete[d] | Maple or Oak Flooring[e] on Yellow Pine Sub-Flooring[c] on Wood Sleepers Embedded in Concrete | Tile or Terrazzo[f] Flooring on Concrete | ¼-in. Battleship Linoleum Directly on Concrete |
| TYPE OF CEILING | | | A | B | C | D | E |
| **No Ceiling** | 4 | 1 | 0.65 | 0.40 | 0.31 | 0.61 | 0.44 |
| | 6 | 2 | 0.59 | 0.37 | 0.30 | 0.56 | 0.41 |
| | 8 | 3 | 0.53 | 0.35 | 0.28 | 0.51 | 0.38 |
| | 10 | 4 | 0.49 | 0.33 | 0.27 | 0.47 | 0.36 |
| ½ in. **Plaster Applied Directly to Under Side of Concrete** | 4 | 5 | 0.59 | 0.38 | 0.30 | 0.56 | 0.41 |
| | 6 | 6 | 0.54 | 0.35 | 0.28 | 0.52 | 0.38 |
| | 8 | 7 | 0.50 | 0.33 | 0.27 | 0.47 | 0.36 |
| | 10 | 8 | 0.45 | 0.32 | 0.26 | 0.44 | 0.34 |
| **Suspended or Furred Metal Lath and Plaster** (¾ in.) **Ceiling** | 4 | 9 | 0.37 | 0.28 | 0.23 | 0.36 | 0.29 |
| | 6 | 10 | 0.35 | 0.26 | 0.22 | 0.34 | 0.28 |
| | 8 | 11 | 0.33 | 0.25 | 0.21 | 0.32 | 0.27 |
| | 10 | 12 | 0.32 | 0.24 | 0.21 | 0.31 | 0.25 |
| **Suspended or Furred Ceiling of Plaster Board** (⅜ in.) **and Plaster** (½ in.) | 4 | 13 | 0.35 | 0.26 | 0.22 | 0.34 | 0.28 |
| | 6 | 14 | 0.33 | 0.25 | 0.21 | 0.32 | 0.26 |
| | 8 | 15 | 0.31 | 0.24 | 0.21 | 0.30 | 0.25 |
| | 10 | 16 | 0.30 | 0.23 | 0.20 | 0.29 | 0.24 |
| **Suspended or Furred Ceiling of Rigid Insulation** (½ in.) **and Plaster** (½ in.) | 4 | 17 | 0.24 | 0.20 | 0.17 | 0.24 | 0.21 |
| | 6 | 18 | 0.23 | 0.19 | 0.17 | 0.23 | 0.20 |
| | 8 | 19 | 0.22 | 0.18 | 0.16 | 0.22 | 0.19 |
| | 10 | 20 | 0.22 | 0.18 | 0.16 | 0.21 | 0.19 |
| **Plaster** (½ in.) **on Corkboard** (1½ in.) **Set in Cement Mortar** (½ in.) **on Concrete** | 4 | 21 | 0.15 | 0.13 | 0.12 | 0.14 | 0.14 |
| | 6 | 22 | 0.14 | 0.13 | 0.12 | 0.14 | 0.13 |
| | 8 | 23 | 0.14 | 0.12 | 0.11 | 0.14 | 0.13 |
| | 10 | 24 | 0.14 | 0.12 | 0.11 | 0.14 | 0.13 |

[a] Computed from factors marked by * in Table 2.
[b] The figures in COLUMN A may be used with sufficient accuracy for concrete floors covered with carpet.
[c] Thickness of yellow pine flooring assumed to be 25/32 in.
[d] The figures in COLUMN B may be used with sufficient accuracy for maple or oak flooring[e] applied directly over the concrete on wood sleepers.
[e] Thickness of maple or oak flooring assumed to be 13/16 in.
[f] Thickness of tile or terrazzo assumed 1 in.

[a] Thickness of tile or terrazzo assumed 1 in.



Copyright, American Society of Heating and Ventilating Engineers—From A.S.H.V.E. Guide.

TABLE 10. COEFFICIENTS OF TRANSMISSION ($U$) OF CONCRETE FLOORS ON GROUND WITH VARIOUS TYPES OF FINISH FLOORING[a, e]

*Coefficients are expressed in Btu per hour per square foot per degree Fahrenheit difference in temperature between the ground and the air over the floor, and are based on still air (no wind) conditions.*

| TYPICAL CONSTRUCTION | Thickness of Concrete (Inches) | No. | TYPE OF FINISH FLOORING | | | | |
|---|---|---|---|---|---|---|---|
| | | | No Flooring (Concrete Bare) | Yellow Pine Flooring[b] on Wood Sleepers Resting on Concrete | Maple or Oak Flooring[c] on Yellow Pine Sub-Flooring on Wood Sleepers Resting on Concrete | Tile or Terrazzo[d] on Concrete | ¼-in. Battleship Linoleum Directly on Concrete |
| Type and Thickness of Insulation | | | A | B | C | D | E |
| None | 4 | 1 | 1.07 | 0.35 | 0.28 | 0.98 | 0.60 |
| | 6 | 2 | 0.90 | 0.33 | 0.27 | 0.84 | 0.54 |
| | 8 | 3 | 0.79 | 0.32 | 0.26 | 0.74 | 0.50 |
| | 10 | 4 | 0.70 | 0.30 | 0.25 | 0.66 | 0.46 |
| None[e] | 4 | 5 | 0.66 | 0.29 | 0.24 | 0.63 | 0.44 |
| | 8 | 6 | 0.54 | 0.27 | 0.23 | 0.52 | 0.39 |
| 1 in. Rigid Insulation[e] | 4 | 7 | 0.22 | 0.16 | 0.14 | 0.22 | 0.19 |
| 1 in. Rigid Insulation[e] | 8 | 8 | 0.21 | 0.15 | 0.13 | 0.20 | 0.18 |
| 2 in. Corkboard[e] | 4 | 9 | 0.12 | 0.099 | 0.093 | 0.12 | 0.11 |
| 2 in. Corkboard[e] | 8 | 10 | 0.12 | 0.096 | 0.090 | 0.12 | 0.11 |

[a] Computed from factors marked by * in Table 2.

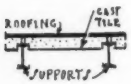
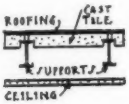
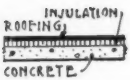
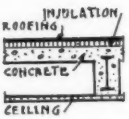
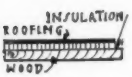
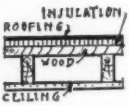
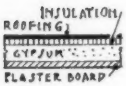
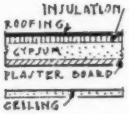
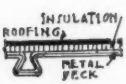
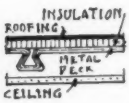
[b] Assumed $^{25}/_{32}$ in. thick.

[c] Assumed $^{13}/_{16}$ in. thick.

[d] Assumed 1 in. thick.

[e] The figures for Nos. 5 to 10, inclusive, include 3-in. cinder concrete placed directly on the ground. The insulation is applied between the cinder concrete and the stone concrete. Usually the insulation is protected on both sides by a waterproof membrane, but this is not considered in the calculations.

TABLE 11. COEFFICIENTS OF TRANSMISSION (*U*) OF VARIOUS TYPES OF FLAT ROOFS COVERED WITH BUILT-UP ROOFING[a]

| TYPICAL CONSTRUCTION | | TYPE OF ROOF DECK | THICKNESS OF ROOF DECK (INCHES) | No |
|---|---|---|---|---|
| WITHOUT CEILINGS | WITH METAL LATH AND PLASTER CEILINGS[d] | | | |
|  |  | **Precast Cement Tile** | 1⅝ | 1 |
|  |  | **Concrete**<br>**Concrete**<br>**Concrete** | 2<br>4<br>6 | 2<br>3<br>4 |
|  |  | **Wood**<br>**Wood**<br>**Wood**<br>**Wood** | 1[b]<br>1½[b]<br>2[b]<br>4[b] | 5<br>6<br>7<br>8 |
|  |  | **Gypsum Fiber Concrete[c]** (2 in.) **on Plaster Board** (⅜ in.)<br>**Gypsum Fiber Concrete[c]** (3 in.) **on Plaster Board** (⅜ in.)<br>**Gypsum Fiber Concrete[c]** (2 in.) **on Rigid Insulation Board** (½ in.)<br>**Gypsum Fiber Concrete[c]** (2 in.) **on Rigid Insulation Board** (1 in.) | 2⅜<br>3⅜<br>2½<br>3 | 9<br>10<br>11<br>12 |
|  |  | **Flat Metal Roofs**<br>Coefficient of transmission of bare corrugated iron (no roofing) is 1.50 Btu per hour per square foot of projected area per degree Fahrenheit difference in temperature, based on an outside wind velocity of 15 mph. | ..... | 13 |

[a]Computed from factors marked by * in Table 2.
[b]Nominal thicknesses specified—actual thicknesses used in calculations.
[c]Gypsum fiber concrete—87½ per cent gypsum, 12½ per cent wood fiber.

Copyright, American Society of Heating and Ventilating Engineers—From A.S.H.V.E. Guide.

*Coefficients are expressed in Btu per hour per square foot per degree Fahrenheit difference in temperature between the air on the two sides, and are based on an outside wind velocity of 15 mph.*

| WITHOUT CEILING—UNDER SIDE OF ROOF EXPOSED | | | | | | | | WITH METAL LATH AND PLASTER CEILINGS[4] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No Insulation | Rigid Insulation (½ in.) | Rigid Insulation (1 in.) | Rigid Insulation (1½ in.) | Rigid Insulation (2 in.) | Corkboard (1 in.) | Corkboard (1½ in.) | Corkboard (2 in.) | No Insulation | Rigid Insulation (½ in.) | Rigid Insulation (1 in.) | Rigid Insulation (1½ in.) | Rigid Insulation (2 in.) | Corkboard (1 in.) | Corkboard (1½ in.) | Corkboard (2 in.) |
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P |
| 0.84 | 0.37 | 0.24 | 0.18 | 0.14 | 0.22 | 0.16 | 0.13 | 0.43 | 0.26 | 0.19 | 0.15 | 0.12 | 0.18 | 0.14 | 0.11 |
| 0.82 | 0.37 | 0.24 | 0.17 | 0.14 | 0.22 | 0.16 | 0.13 | 0.42 | 0.26 | 0.19 | 0.15 | 0.12 | 0.18 | 0.14 | 0.11 |
| 0.72 | 0.34 | 0.23 | 0.17 | 0.13 | 0.21 | 0.16 | 0.12 | 0.40 | 0.25 | 0.18 | 0.14 | 0.12 | 0.17 | 0.13 | 0.11 |
| 0.64 | 0.33 | 0.22 | 0.16 | 0.13 | 0.21 | 0.15 | 0.12 | 0.37 | 0.24 | 0.18 | 0.14 | 0.11 | 0.17 | 0.13 | 0.11 |
| 0.49 | 0.28 | 0.20 | 0.15 | 0.12 | 0.19 | 0.14 | 0.12 | 0.32 | 0.21 | 0.16 | 0.13 | 0.11 | 0.15 | 0.12 | 0.10 |
| 0.37 | 0.24 | 0.18 | 0.14 | 0.11 | 0.17 | 0.13 | 0.11 | 0.26 | 0.19 | 0.15 | 0.12 | 0.10 | 0.14 | 0.11 | 0.095 |
| 0.32 | 0.22 | 0.16 | 0.13 | 0.11 | 0.16 | 0.12 | 0.10 | 0.24 | 0.17 | 0.14 | 0.11 | 0.097 | 0.13 | 0.11 | 0.092 |
| 0.23 | 0.17 | 0.14 | 0.11 | 0.096 | 0.13 | 0.11 | 0.091 | 0.18 | 0.14 | 0.12 | 0.10 | 0.087 | 0.11 | 0.096 | 0.082 |
| 0.40 | 0.25 | 0.18 | 0.14 | 0.12 | 0.17 | 0.13 | 0.11 | 0.27 | 0.19 | 0.15 | 0.12 | 0.10 | 0.14 | 0.12 | 0.097 |
| 0.32 | 0.22 | 0.16 | 0.13 | 0.11 | 0.15 | 0.12 | 0.10 | 0.23 | 0.17 | 0.14 | 0.11 | 0.097 | 0.13 | 0.11 | 0.091 |
| 0.26 | 0.19 | 0.15 | 0.12 | 0.10 | 0.14 | 0.11 | 0.10 | 0.20 | 0.16 | 0.13 | 0.11 | 0.09 | 0.12 | 0.10 | 0.087 |
| 0.19 | 0.15 | 0.12 | 0.10 | 0.09 | 0.12 | 0.10 | 0.08 | 0.16 | 0.13 | 0.11 | 0.09 | 0.08 | 0.10 | 0.09 | 0.077 |
| 0.95 | 0.39 | 0.25 | 0.18 | 0.14 | 0.23 | 0.17 | 0.13 | 0.46 | 0.27 | 0.19 | 0.15 | 0.12 | 0.18 | 0.14 | 0.11 |

[4]These coefficients may be used with sufficient accuracy for wood lath and plaster, or plaster board and plaster ceilings. It is assumed that there is an air space between the under side of the roof deck and the upper side of the ceiling.

**Copyright, American Society of Heating and Ventilating Engineers—From A.S.H.V.E. Guide.**

Copyright, American Society of Heating and Ventilating Engineers—From A.S.H.V.E. Guide.

## TABLE 12. COEFFICIENTS OF TRANSMISSION (*U*) OF PITCHED ROOFS[a]

*Coefficients are expressed in Btu per hour per square foot per degree Fahrenheit difference in temperature between the air on the two sides, and are based on an outside wind velocity of 15 mph.*

| TYPICAL CONSTRUCTION | TYPE OF ROOFING AND ROOF SHEATHING | INSULATION BETWEEN ROOF RAFTERS | No. | TYPE OF CEILING (APPLIED DIRECTLY TO ROOF RAFTERS) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | No Ceiling (Rafters Exposed) | Metal Lath and Plaster (¾ in.) | Plaster Board (⅜ in.) and Plaster (½ in.) | Wood Lath and Plaster | Rigid Insulation (½ in.) | Rigid Insulation (½ in.) and Plaster (½ in.) | Rigid Insulation (1 in.) and Plaster (½ in.) | Corkboard (1½ in.) and Plaster (½ in.) | Corkboard (2 in.) and Plaster (½ in.) |
| | | | | A | B | C | D | E | F | G | H | I |
| | Wood Shingles on Wood Strips[b] | None | 1 | 0.46 | 0.30 | 0.29 | 0.29 | 0.22 | 0.21 | 0.16 | 0.12 | 0.10 |
| | | ½ in. Flexible[c] | 2 | ..... | 0.17 | 0.16 | 0.16 | 0.14 | 0.13 | 0.11 | 0.091 | 0.079 |
| | | 1 in. Flexible[c] | 3 | ..... | 0.13 | 0.12 | 0.12 | 0.11 | 0.11 | 0.092 | 0.078 | 0.069 |
| | | Bright Aluminum Foil[d] | 4 | ..... | 0.22 | 0.21 | 0.21 | 0.18 | 0.17 | 0.14 | 0.11 | 0.089 |
| | | 3½ in. Rock Wool[e] | 5 | ..... | 0.063 | 0.062 | 0.062 | 0.058 | 0.058 | 0.053 | 0.048 | 0.044 |
| | Asphalt Shingles, Rigid Asbestos Shingles, Composition Roofing, or Slate or Tile Roofing[f] on Wood Sheathing[g] | None | 6 | 0.56 | 0.34 | 0.32 | 0.32 | 0.24 | 0.23 | 0.17 | 0.13 | 0.11 |
| | | ½ in. Flexible[c] | 7 | ..... | 0.18 | 0.17 | 0.17 | 0.14 | 0.14 | 0.12 | 0.094 | 0.089 |
| | | 1 in. Flexible[c] | 8 | ..... | 0.13 | 0.13 | 0.13 | 0.11 | 0.11 | 0.095 | 0.080 | 0.071 |
| | | Bright Aluminum Foil[d] | 9 | ..... | 0.24 | 0.24 | 0.24 | 0.19 | 0.18 | 0.14 | 0.11 | 0.098 |
| | | 3½ in. Rock Wool[e] | 10 | ..... | 0.065 | 0.064 | 0.064 | 0.060 | 0.059 | 0.054 | 0.049 | 0.045 |

[a] Computed from factors marked by * in Table 2. Nos. 6 to 10, inclusive, based on ½-in. thick slate.
[b] Based on 1 in. by 4 in. strips spaced 2 in.
[c] Figures based on two air spaces. Insulation may also be applied to under side of roof rafters with furring strips between.
[d] Roofing felt between roof sheathing and slate or tile neglected in calculations.
[e] Assumed 3½ in. thick based on the actual width of 2 in. by 4 in. rafters.
[f] Sheathing assumed ½ in. thick.
[g] Air space faced on one side with bright aluminum foil.

TABLE 13. COEFFICIENTS OF TRANSMISSION ($U$) OF DOORS, WINDOWS, SKYLIGHTS AND GLASS WALLS

*Coefficients are based on a wind velocity of 15 mph, and are expressed in Btu per hour per square foot per degree Fahrenheit difference in temperature between the air inside and outside of the door, window, skylight or wall*

*A. Windows and Skylights*

| DESCRIPTION | $U$ |
|---|---|
| Single | 1.13[a, c] |
| Double | 0.45[a] |
| Triple | 0.281[a] |

*B. Solid Wood Doors*[b, c]

| NOMINAL THICKNESS INCHES | ACTUAL THICKNESS INCHES | $U$ |
|---|---|---|
| 1 | $2\frac{5}{32}$ | 0.69 |
| $1\frac{1}{4}$ | $1\frac{1}{16}$ | 0.59 |
| $1\frac{1}{2}$ | $1\frac{5}{16}$ | 0.52 |
| $1\frac{3}{4}$ | $1\frac{3}{8}$ | 0.51 |
| 2 | $1\frac{5}{8}$ | 0.46 |
| $2\frac{1}{2}$ | $2\frac{1}{8}$ | 0.38 |
| 3 | $2\frac{5}{8}$ | 0.33 |

*C. Glass Walls*

| DESCRIPTION | $U$ |
|---|---|
| Hollow glass tile wall, 6 x 6 x 2 in. thick blocks<br>Wind velocity 15 mph, outside surface; still air, inside surface | 0 60 |
| Still air, outside and inside surface | 0.48 |

[a] See *Heating, Ventilating and Air Conditioning*, by Harding and Willard, revised edition, 1932.
[b] Computed using $C = 1.15$ for wood; $f_i = 1.65$ and $f_o = 6.0$.
[c] It is sufficiently accurate to use the same coefficient of transmission for doors containing thin wood panels as that of single panes of glass, namely, 1.13 Btu per hour per square foot per degree difference between inside and outside air temperatures.

The thicknesses upon which the coefficients in Tables 3 to 13, inclusive, are based are as follows:

| | |
|---|---|
| Brick veneer | 4 in. |
| Plaster and metal lath | $\frac{3}{4}$ in. |
| Plaster (on wood lath, plasterboard, rigid insulation, board form, or corkboard) | $\frac{1}{2}$ in. |
| Slate (roofing) | $\frac{1}{2}$ in. |
| Stucco on wire mesh reinforcing | 1 in. |
| Tar and gravel or slag-surfaced built-up roofing | $\frac{3}{8}$ in. |
| 1-in. lumber (S 2-S) | $2\frac{5}{32}$ in. |
| 1½-in. lumber (S-2-S) | $1\frac{5}{16}$ in. |
| 2-in. lumber (S-2-S) | $1\frac{5}{8}$ in. |
| 2½-in. lumber (S-2-S) | $2\frac{1}{8}$ in. |
| 3-in. lumber (S-2-S) | $2\frac{5}{8}$ in. |
| 4-in. lumber (S-2-S) | $3\frac{5}{8}$ in. |
| Finish flooring (maple or oak) | $1\frac{3}{16}$ in. |

Solid brick walls are based on 4-in. hard brick (high density) and the remainder common brick (low density). Stucco is assumed to be 1-in. thick on masonry walls. Where metal lath and plaster are specified, the metal lath is neglected.

Copyright, American Society of Heating and Ventilating Engineers—From A.S.H.V.E. Guide.

HEAT TRANSFER SPECIALISTS SINCE 1896

MODEL 33 THERMOSTATIC EXPANSION VALVES

•

AUTOMATIC EXPANSION VALVES

•

CONSTANT PRESSURE VALVES

•

CHECK VALVES

•

EVAPORATORS

•

CONDENSERS

•

UNIT COOLERS

•

NON-FROST COILS

•

PLAIN TUBE COILS

•

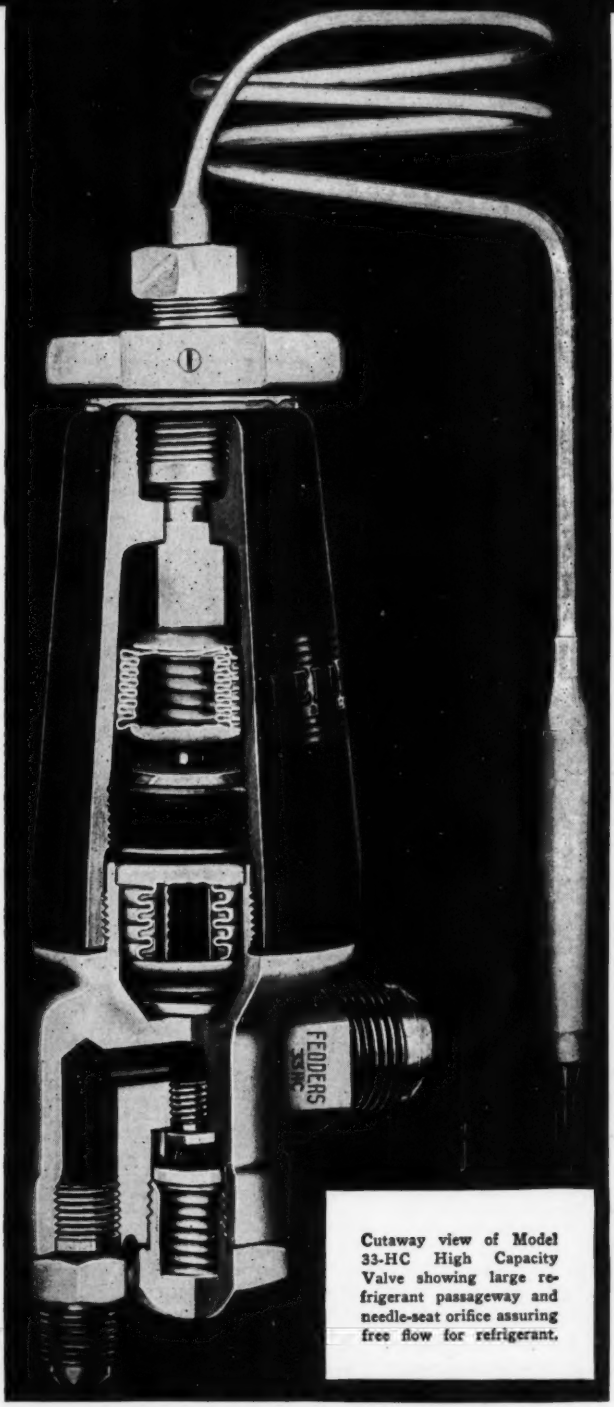
ICE CUBE MAKERS

•

ALL SEASON AIR CONDITIONING UNITS

•

BLAST HEATING AND COOLING COILS




Cutaway view of Model 33-HC High Capacity Valve showing large refrigerant passageway and needle-seat orifice assuring free flow for refrigerant.

# FEDDERS MANUFACTURING CO.
## BUFFALO, NEW YORK

Atlanta - Boston - Chicago - Cincinnati - Dallas - Detroit - Los Angeles - New York - Philadelphia

# FEDDERS *Sensitive* ADJUSTMENT

● **REFRIGERATION MEN** appreciate the eas sensitive adjustment of Fedders Model 33 Thermo static Expansion Valves. They find that it enable them to balance up the system easily. Accurate, sen sitive adjustment is easily made by the conveniently located thumb nut without the use of tools.

In addition, high vapor power element charge assuring sensitive op eration throughout the entire temperature range, has made Fedder Model 33 Valves known as "the brains of the system".

Other features include close grained, drop forged valve body whicl eliminates seepage leaks, exclusive interchangeable power element moulded housing, push pin and guide which insulates body fron power element. Sold by Representative Suppliers Everywhere.

S. Pat. No. 1,974,621 1,987,948 2,011,379

e You G the FE Your Copy S NEWS?

# Servicing the McClellan Refrigeration Unit

## Fifth Article—Continued from December

BY L. K. WRIGHT, M.E.

### Determining Correct Head Pressure

To determine if head pressure is correct first obtain the temperature of the inlet water and of the outlet water. Add these two figures together and divide by two to obtain the average temperature.

Read low pressure gauge and find temperature corresponding to this pressure on Table 1. Then refer to the Factor Table, Table 2, on which first locate the "back pressure temperature." Run finger across this line to column of average water temperature, to find factor. Add this factor to average water temperature. Then refer to Pressure-Temperature Table, under temperature and find pressure indicated as correct head pressure.

TABLE 1. PRESSURE-TEMPERATURE TABLE

| Temperature | Pressure | Temperature | Pressure |
|---|---|---|---|
| —10 | 9.0 | 65 | 103.1 |
| — 5 | 12.2 | 70 | 114.1 |
| 0 | 15.7 | 75 | 125.8 |
| + 5 | 19.6 | 80 | 138.3 |
| 10 | 23.8 | 85 | 151.7 |
| 15 | 28.4 | 90 | 165.9 |
| 20 | 33.5 | 95 | 181.1 |
| 25 | 39.0 | 100 | 197.2 |
| 30 | 45.0 | 105 | 214.2 |
| 35 | 51.6 | 110 | 232.2 |
| 40 | 58.6 | 115 | 251.5 |
| 45 | 66.3 | 120 | 271.7 |
| 50 | 74.5 | 125 | 293.1 |
| 55 | 83.4 | 130 | 315.6 |
| 60 | 92.9 | | |

TABLE 2. FACTOR TABLE

| Evap. ° F. | Average Water Temp. 60° | 70° | 80° | 90° | 100° |
|---|---|---|---|---|---|
| —30 | 15 | 15 | 15 | 10 | 10 |
| —25 | 15 | 15 | 15 | 15 | 10 |
| —20 | 20 | 20 | 15 | 15 | 15 |
| —15 | 20 | 20 | 20 | 15 | 15 |
| —10 | 20 | 20 | 20 | 15 | 15 |
| — 5 | 20 | 20 | 20 | 15 | 15 |
| 0 | 25 | 25 | 20 | 20 | 15 |
| + 5 | 30 | 30 | 30 | 25 | 20 |
| 10 | 35 | 35 | 30 | 25 | 20 |
| 15 | 40 | 35 | 30 | 25 | 20 |
| 20 | 40 | 35 | 30 | 25 | 25 |
| 25 | 45 | 40 | 35 | 30 | 30 |

Example:—Assume a machine with a back pressure of 25 lbs. Water inlet at 60 degrees F. and outlet at 100 degrees F.

Refer to Pressure-Temperature Table and run down pressure column. Nearest to 25 lbs. is 23.8 and this corresponds to + 10 degrees F.

Average water temperature is $60 + 100 = 160$

$$\frac{160}{2} \text{ equal } 80$$

Refer to Factor Table. Find + 10 degrees F. in left hand column. Run finger along this line to 80 degree column, where 30 will be found as the factor. Add this 30 to the original 80, thus $30 + 80$ equals 110. Go back to Pressure-Temperature Table and locate 110 in the Temperature column. Pressure corresponding to this is 232.2 lbs.

### Causes of High Head Pressure

A pressure of 170 lbs. or more on gauge (5) indicates that condensing water is unusually warm or is not circulating through the machine in sufficient quantities. If this is due to water being shut off at some point in the line ahead of the machine, the water switch will automatically open and stop the motor. If, however, it is caused by obstruction in the water drain line, the water switch will remain closed, with a resulting building up of pressure. Excessive pressure must be avoided, especially where safety valves are installed, for if the pressure arrives at the setting on the safety valve the charge will be lost.

Some machines have high pressure cut-outs, arranged to cut out at about 250 lbs.

Drain lines must be kept free from any obstruction and circulation maintained.

The water outlet valve (18) must be set to permit escape of sufficient water to keep the head pressure within proper range.

On the old type of compressors it was necessary to remove the outer head and scrub out the water jacket every three or four years.

Condensers can be cleaned by running a rusticide through them, permitting the so-

lution to remain in the vessel long enough to eat away the rust.

### Disassembling Machine for Repairs

Should it be necessary to disassemble compressor for inspection or repair of valves, shut down machine by closing water inlet valve (17) and valves (1) and (3).

Drain water from the cylinder water jacket by removing plug (31).

Purge gases from compressor by slightly opening valve (11) and after pressure is released, take off cap nuts on cylinder head or heads and remove same.

After inspection and repairs are completed, new gaskets should be used in replacing cylinder head and the piston should be at highest point of the stroke. After compressor head has been replaced, start the machine by holding the electrical contacts of water switch closed with a dry stick and open valve (36). The pressure on gauge (5) will run up quickly and when it reaches 250 lbs., the machine should be stopped by releasing stick on switch. The tightness of the inner gasket should then be tested by screwing a short piece of 3/8 inch bent pipe in the opening for plug (31) and immersing the open end in a bottle of water; bubbles will show that gasket is leaking and nuts on heads should be tightened further until air bubbles cease. If this cannot be accomplished, the head should be removed and both gaskets and seats carefully cleaned and the operation repeated until the absence of air bubbles in water bottle indicates that packing is tight.

On machines equipped with separate ammonia and water jacket heads, the method of procedure will be similar to the above except that instead of using a piece of bent pipe, it will merely be necessary to replace plug (31) after the inner head has been bolted down and then fill water jacket so that this head is covered. After pumping up air pressure, a leak will be shown by air bubbles arising from the defective joint.

After the ammonia head has been made tight, replace the outer head and release air from valve (11), then close valves (36) and (11), open water inlet valve (17), after removing fuses from water switch in order to prevent motor from starting. When water has circulated for a few moments, close valve (18) to build up a maximum water pressure on machine and see that the outer or water gasket is tight; then release water pressure and after water switch has opened, replace the fuses.

Purge air from the compressor and pipe by opening valve (1) momentarily and purging from valve (11); then close valve (11) and start machine by opening water inlet valve (17) and adjusting water outlet valve (18). Make certain that water is circulating, after which valves (3) and (1) may be opened and the machine put in normal operation.

A final test should be made on the jacket water after machine has been operating on ammonia for a few moments to make certain that there is no leakage of ammonia. This should be done by immersing a strip of sensitized paper in a sample of jacket water; if the paper remains colorless, the absence of ammonia in the water will be shown.

### Purging System

It is necessary to purge the system when the presence of air or other foreign gases is shown by gauge (5) indicating a higher pressure than usual and showing rapid vibration of needle.

When it is necessary to purge the system, the machine should be pumped down and valves (1) and (3) closed, after gauge (20) reads "zero." The cooling water should be allowed to circulate freely through system for 15 or 20 minutes after machine has been stopped. This causes all ammonia in system to liquefy in condenser while air and all foreign gases will rise to the top. Then attach purge hose to valve (11) and open valves (3) and (11) and purge all foreign gases into water.

The object of the water is to absorb ammonia gas and care should be used when purging the system to open valve (11) but slightly so as not to waste ammonia. When air or other foul gas is discharged in water, the bubbles will rise to the top as long as the gas is discharged. As soon as bubbles cease and ammonia gas is being discharged and absorbed, as indicated by a rattling sound in water, valve (11) should be promptly closed.

If the water has absorbed all of the ammonia gas which it is capable of taking, it should be replaced with fresh water, otherwise the additional ammonia gas will not be absorbed and the bubbles of same arising through the ammonia liquor may be mistaken for air, with a resulting waste of ammonia.

*(Continued in the next issue)*

# NEW MECHANICAL DEVICES
## Service Tools and Special Equipment

**Under this heading there will be published illustrated descriptions of new or improved service tools and equipment for the Service Engineer. Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.**

### DRIP PIPE INSTALLATION ATTRACTS UNUSUAL ATTENTION

SHOWN in the accompanying picture is a "Triple Trough" drip drain installation. This new design has shown itself so superior after thorough laboratory tests, that the 10 months practical service in the field is fully confirming the test.

The "Triple Trough" principle definitely reduces dripping to a minimum. Its name is derived from the fact of its consisting of three distinct troughs: an unusually deep primary; an insulated secondary trough; and a third trough designed to act as final prevention against any drip.

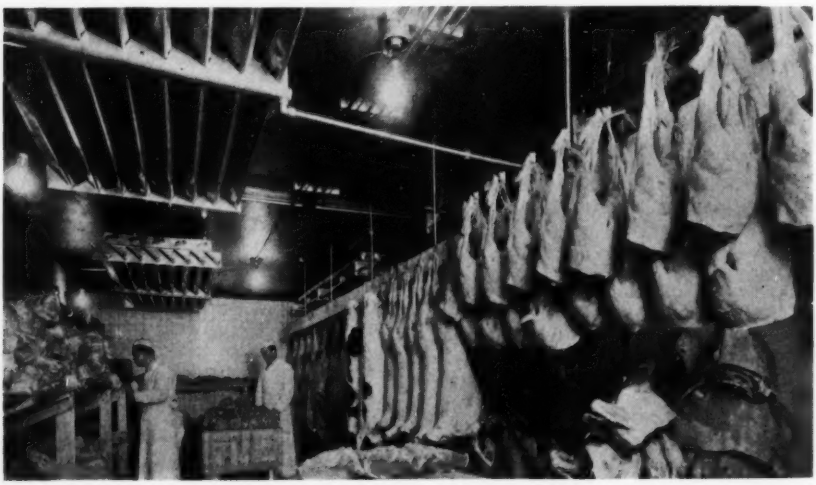
Attention is called to the ample space, for warm air rise, which has been left on either side of each coil. The adjustable hangers, and the "L" type drain connections are noteworthy.

The Trenton Auto Radiator Works, manufacturers of Kramer refrigeration and heating equipment, have just published a bulletin number 237 covering their "Triple Trough" temperator drip pans. Besides cataloging various sizes, the bulletin explains how the possibility of condensate drip has been practically eliminated.

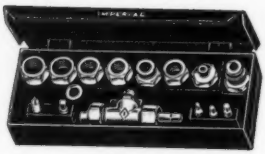
### NEW SERVICE VALVE KIT FOR HERMETIC UNITS OFFERED BY IMPERIAL

A NEW service valve kit for use in purging, charging and testing practically all makes of hermetically sealed condensing units has been announced by The Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill. This kit contains a special valve with eight different adapters for attaching the valve to the different units, and five keys, which will fit the charging plugs found on these units.

The use of this kit, the manufacturer states, makes it unnecessary to have a num-



A typical "triple trough" drip drain installation



IMPERIAL CHARGING VALVE KIT

ber of different service valves for the various makes of such equipment.

The kit can be used with the following hermetic units: Bohn (methyl chloride), Bohn (sulphur dioxide); Cold Spot; Cold Spot (1935-6-7); Frigidaire; General Electric; Gibson; Grunow; Majestic; Majestic Hermetic; Servel; Television; Trukold; U. S. Radio; Westinghouse (large) and Westinghouse (small).

Operation of the valve is simple, it is stated. After removing sealing cap or plug from hermetic unit, the proper adapter is screwed into place, the proper key is fitted to the charging plug, and the service valve is attached to the adapter. The unit is then ready for purging, charging or testing.

The complete outfit, which includes valve, 13 adapters and keys and four gaskets, is supplied in a specially fitted metal box which is labelled inside to show which adapter to use on each unit.

S S S

## BACK PRESSURE REGULATOR—

ELECTRIMATIC Type RB Back Pressure Regulators are designed particularly for use in suction lines of small installations, such as cold diffusers, beverage coolers, walk-in coolers, etc., wherever it is

BACK PRESSURE REGULATOR

necessary to control the evaporator pressure within close limits. They may be used on single evaporators or on multiple installations requiring different temperatures.

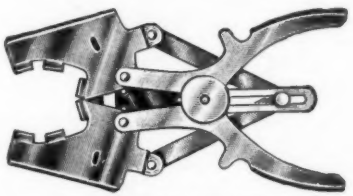
Small and compact, this regulator incorporates power piston operation, diaphragm controlled pilot valve, manual opening stem, and flanged construction, features usually found only in much heavier and more expensive equipment.

These regulators are actuated by a feeler line run from the evaporator or surge drum to the opening provided on the side of the diaphragm chamber. By mounting a small electric valve in the feeler line, the unit is converted into a combination back pressure regulator and suction stop valve.

S S S

## NEW PISTON RING EXPANDER

THROUGH a recently perfected piston ring expanding tool in two sizes to more conveniently remove and replace piston rings, a troublesome time consuming job is made a matter of but a few seconds with these quick acting, easy operating piston ring expanders. One, A-27, handles 1¼" to 2¼" O.D. piston rings and the other, A-28, handles 2⅛" to 3¾" O.D. piston rings.



PISTON RING EXPANDER

Expanding the piston ring uniformly permits passing of the ring over the head of the piston and installation in the desired groove without error or difficulty.

Installation or removal of piston rings without danger of breakage, distortion or damage is a guarantee of these expanders.

The procedure is simple, being to have the jaws of the tool grasp the rings at the side, engage the prongs between the points of the ring, and compress the handles. The pressure on the sides of the piston ring not only insures a firm hold but causes the ring to expand front and back, as well as sideways, thus reducing the amount of spread necessary to clear the piston.

In installing, pass ring over the piston to lowest groove and release grip. Repeat for other grooves in order.

In removing rings, engage as described starting with the top ring and release hand grip when free of piston.

There are no adjustments and all rings are expanded with equal ease, whether step-cut, diagonal-cut, or straight-cut.

Further information may be obtained from the Perfection Refrigeration Parts Co. at Harvey, Ill.

## NEW "MIDGET" ELECTRIC SOLDERING PLIERS

IN answer to the increasing demand for a smaller low capacity soldering unit, that would heat electrically, sweat joints without unsweating adjacent connections, and eliminate the open flame hazards, the Ideal Commutator Dresser Co., 1093 Park Avenue, Sycamore, Ill., has introduced the new No. 2 "Midget" Type Thermo-Grip Pliers.

ELECTRIC SOLDERING PLIERS

This tool has been designed especially for soldering small objects and for work in restricted spaces and for ease of operation. A few typical applications are: For soldering small lugs and terminals up to 150 amp., in close quarters on switchboards, motors, generators—for various small radio and appliance soldering—for sweating joints on small copper tubing and fittings up to ⅜ inch diameter.

The small power requirement (300 watts) permits the use of the unit on any standard lighting circuit without danger of overloading the circuit or burning out fuses.

The pliers are made of cast bronze (long, slender, small jaws), so that they will fit into restricted spaces. The jaws are hinged at the back and have a spring, which holds them normally in the open position.

## KELVINATOR LAUNCHES SIXTH "USER GOOD WILL" CAMPAIGN

THIS winter Kelvinator is conducting its sixth annual "User Good Will" campaign through its Service Department. The object of the campaign, according to E. A. Seibert, Director of Service, is to stimulate sales during the winter months and to keep more service men gainfully employed by distributors and dealers.

"The suggestions that we are offering to distributors and dealers in the 'User Good Will' program are intended to increase service department volume and also to increase retail sales," states Mr. Seibert. "Primary emphasis has been placed on the advantages of obtaining large repair jobs on commercial and apartment house multiple equipment, as well as selling replacement parts for such installations. A periodic check-up on electric household appliances maintains consumer good will and often leads to new sales.

"Many commercial installations are 'weeded out' where old-style cooling units such as brine tanks or deep fin units, old-style water valves or expansion valves, and old-style tubing fittings or tubing, require replacement. In numerous cases, previous experience demonstrates, the job has resulted in new installations, or repairs have brought in comparatively large sums and a good margin of profit."

An "inspection tag" listing the wearing parts, and showing the inspection date and the results of this inspection, is pasted on the door jamb of the household refrigerator as a reminder of this service. An itemized schedule of moderate charges makes this maintenance service easily merchandised, when once established by dealers.

Accessory sales are an important part of this year's "User Good Will" campaign. Practically all convenience features of the latest refrigerator models may be added to other Kelvinator models in use. The housewife is an anxious and willing customer for this service, frequently buying much-needed accessory equipment. Among this service equipment for the electric refrigerator are rubber Flexo-Trays, fitting inside the regular metal tray and easily removable; freezing tray releases; sliding shelves; dairy racks for storing eggs, butter and cheese; leftover food storage dishes, refrigerated pastry sets and accessory dishes; vegetable crispers; and interior lighting equipment.

## KOLD-HOLD ELECTS NEW OFFICERS

AT a recent annual meeting of the Kold-Hold Manufacturing Company the following officers were elected:

J. R. Tranter, *President*
J. M. Degnan, *Vice-President*
Carl Reynolds, *Secretary*
L. H. Hull, *Treasurer*

# REFRIGERATION SERVICE ENGINEERS' SOCIETY

**Official Announcements of the activities of the National Society and Local Chapters appear in this department as well as articles pertaining to the educational work of the Society.**

**THE OBJECTS OF THE SOCIETY**

To further the education and elevation of its members in the art and science of refrigeration engineering; for the reading and discussion of appropriate papers and lectures; the preparation and distribution among the membership of useful and practical information concerning the design, construction, operation and servicing of refrigerating machinery.

**ASSOCIATION HEADQUARTERS: 433-435 North Waller Ave., CHICAGO, ILL.**

## KANSAS CITY CHAPTER

**Meeting of December 14, 1937**

*By* **S. A. LEITNER,** *Acting-Secretary*
**3112 Holmes St., Kansas City, Mo.**

THE meeting was called to order by President Green at 8:45 p.m.

Application of Mr. R. W. Young, applying for associate membership was presented and referred to the membership committee for approval. Membership committee reported the following on application of Mr. Chas. Stein: that he wanted to withdraw his application until a future date pending certain conditions, inasmuch as no action had been taken on his application. It was suggested by the President that the membership committee keep in touch with Mr. Stein.

The proposed changes to the constitution and by-laws were read for the second time and will be voted on, at the first meeting in January.

President Green announced a special Board of Directors meeting would be held on Thursday, the 16th, and urged all the officers and directors to attend.

Visitors present at the meeting were Mr. J. W. Carlson, business representative of the Steamfitters and Helpers Local No. 533, accompanied by Mr. Miller of their Educational Board. Mr. Carlson was accorded the privilege of addressing our members and he gave a talk on the aims and purposes of the local that he represents, stressing particularly the need for co-operation and organization. Mr. Carlson informed the members present that he would co-operate with them at all times. He also invited our chapter members to attend their meetings.

President Green thanked Mr. Carlson for his talk, and assured him it was well taken.

As there was no further business, and every one present was anxious to partake of the refreshments, a motion, duly seconded, to adjourn was presented and carried.

* * *

## ILLINOIS STATE ORGANIZATION BEING DISCUSSED

AT a joint meeting of the Tri-County, Rockford and Chicago Chapters, held on December 13th at Elgin, Illinois, ways and means and the desirability of forming a state organization were discussed.

Mr. C. Buschkopf of Beaver Dam, Wisconsin, and H. D. Busby of Chicago told of the experiences of the other state organizations, while Messrs. F. Roth of Chicago, R. C. McCarthy of Rockford, Ivar Skipple of Chicago, and Harvey Burgess of Tri-County Chapter, expressed varied advantages of such an organization.

After considerable discussion the following resolutions were presented and approved:

Whereas, We consider that there is need for a State Association of the Refrigeration Service Engineers Society in Illinois, therefore, be it

Resolved, That this association shall be composed of members of local chapters, members of chapters in other states, but whose residence is in Illinois, and members-at-large whose residence is in Illinois.

Resolved, That a committee consisting of two members from each chapter and

Views of the Chicago Chapter's initiation team at work during the recent joint meeting with the Rockford and Tri-County Chapters. (1) The cat walk, which is done in bare feet. (2) The team. (3) Snaking tubing between flooring joists. (4) Blindfolded in the boxing ring.

.003
FIGURES ON ICE
ESOTOO CONTAINS ONLY .003% MOISTURE!
Truly efficient automatic refrigeration can only be had with a refrigerant that is *pure* and *dry!*
EXTRA DRY ESOTOO is as pure as endless diligence and painstaking care can make it.
It is as dry as technical skill, expert supervision, and meticulous work can make it—containing only .003% moisture.
Uniformly dependable EXTRA DRY ESOTOO is available for prompt delivery in every part of the world.
EXTRA DRY
ESOTOO
PRODUCT OF
VIRGINIA SMELTING CO.

THE THREE PRESIDENTS
Left to right: R. C. McCarthy, of Rockford; H. Burgess, of Tri-County; Ivar Skipple, of Chicago.

two members-at-large or members of other chapters located out of the state but whose residence is in Illinois, be appointed to meet and formulate plans for the organization of this state association.

Resolved, That when this committee is ready to report they shall have power to call the next meeting of this body.

An interesting entertainment feature of the evening was a demonstration by the Chicago Chapter initiation team. Four members of the Tri-County and Rockford Chapters were initiated much to the amusement of the entire group.

An educational feature of the evening was the presentation by P. O. Domke of the Mueller Brass Company's latest products.

Refreshments were served after adjournment.

* * *

## INDIANAPOLIS CHAPTER

### Meeting of December 7, 1937

*By* E. R. CLAUS, *Secretary*

815 S. Delaware St., Indianapolis, Ind.

THE regular meeting of the Indianapolis Chapter No. 1 of the Refrigeration Service Engineers Society was called to order by President Drake at the Indiana Air Conditioning & Refrigeration School, Tuesday, Dec. 7th. Reports were read by Secretary Claus, and Treasurer Wm. Uhrig. The applications of six new members were accepted, and were given the obligation by Pres. Drake.

Mr. Snell of the Power Equipment Co. gave a complimentary talk on the progress


How To Get More Fun Out Of Life

PEERLESS THERMAL EXPANSION VALVE—MODEL 7

The best way we can think of to make life easier for you Service Engineers is to eliminate Thermal Expansion Valve troubles and worries. If you will standardize on Peerless Thermal Expansion Valve, Model 7, you'll find valve troubles fading into the dim past.

Model 7 is a diaphragm type valve with forged brass body. Orifice is full opening, tight closing, ball type with hardened stainless steel ball and spring. Thermal bulb contains a semi-liquid charge and is hermetically sealed. Large area, phosphor bronze diaphragm gives accurate control while three pusher pins insure that the ball will center in the orifice.

PEERLESS of AMERICA, Inc.

ESTABLISHED IN 1912 AS THE PEERLESS ICE MACHINE CO.

MAIN FACTORY - GENERAL OFFICES
515 West 35th St.
CHICAGO

New York Factory
43-20 34th St.
Long Island City

Pacific Coast Factory
3000 S. Main St.
Los Angeles

Peerless Jobbers in all Principal Cities

# TIME TESTED AND IMPROVED!

## DEHYDRATORS

These new TIME-TESTED Dehydrators have these outstanding advantages:

1. Cone-shaped screen—providing greatly increased separating area. Shape of screen causes particles to settle at base of cone, permitting free passage of refrigerant through center.
2. Pure wool packing inside cone screen—a further protection which traps dust-like particles which may penetrate screen.
3. Improved felt pad between interior cone screen and exterior flat screen.

Most dehydrating agents used in refrigerating systems are continually being sub-divided into smaller or dust-like particles. This may happen through the taking up of moisture, or by abrasion, etc. These particles restrict the capacity of, and sometimes completely clog the disc screens and filters with which the old, or conventional, type dehydrator is equipped, resulting in pressure drop and eventual trouble at the expansion valves.

All Mueller Brass Co. Dehydrators are now provided with cone-shaped screens. This new feature, together with other improvements, provides maximum drying efficiency with minimum pressure drop. There is a right style for every purpose. Write for descriptive literature.

*Stocked by leading jobbers everywhere.*

**MUELLER BRASS CO.**
PORT HURON, MICHIGAN
**STREAMLINE**
TRADE MARK REG. U. S. PAT. OFFICE

**MORE EFFICIENT · LESS RESTRICTION · GREATLY INCREASED SCREEN AREA ·**

of the Indianapolis Chapter. Following Mr. Snell's talk came the election of officers. The following officers were elected to serve for the year 1938:

*President*—J. O. Cummings
*1st Vice-President*—Harold Klepfer
*2nd Vice-President*—Ralph Duncan
*Secretary*—J. A. Salter
*Treasurer*—Albert Brandlein
*Sergeant-at-Arms*—Elwood Wulf

*Board of Directors*—Wm. Drake, Chairman; Harry McMinds, E. R. Claus, Ray Holbrook, Wm. Uhrig. Educational Committee: J. A. Cassady, and Russell Duncan.

The committee which was appointed to arrange for a dinner dance to be held at the Hoosier Athletic Club, Dec. 15th, for members and friends reported progress in arrangements and ticket sales.

## INDIANAPOLIS CHAPTER ANNUAL DINNER

THE first annual dinner dance of the Indianapolis chapter of Refrigeration Service Engineers Society was held at the Hoosier Athletic Club, Wednesday, Dec. 15. The evening was a great success in more ways than one. A short business session was held between the dinner and the dance at which time the new officers for next year were introduced by Master of Ceremonies R. C. Robinson. A short talk was given by Mr. J. E. Cummings on the progress of the newly-formed Ladies Auxiliary. Following this there was a floor show given by the students of a local dance school. The remainder of the evening was spent in dancing.

The happy group to the left of the page is visual proof of the good time enjoyed by all.

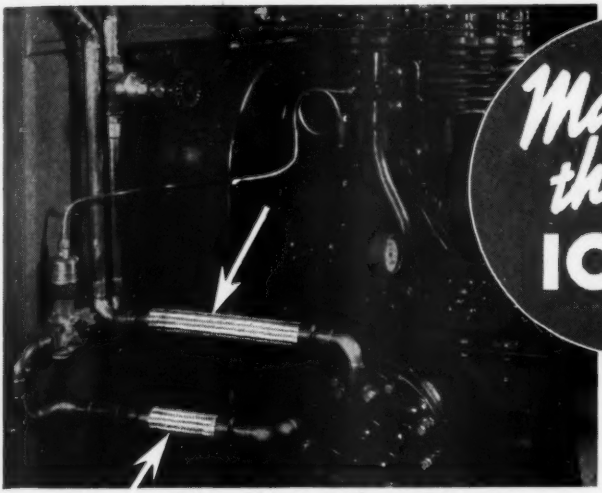
## TRI-STATE CHAPTER ORGANIZED AT HUNTINGTON, W. VA.

THIS first meeting was held December 6, 1937, in the offices of the Air-Ola Radio Company, 704 Eighth Avenue, Huntington, W. Va.

Meeting called to order at 8:15 p.m. by Temporary Chairman, A. W. Albertsen. The minutes of the organization meeting held October 29, 1937, were read by Temporary Secretary-Treasurer, Claude Brunton, and approved as read.

Mr. Albertsen then called to the attention

# AMERICAN VIBRATION ELIMINATORS



Typical installation of American Vibration Eliminators

**Make the job 100%**

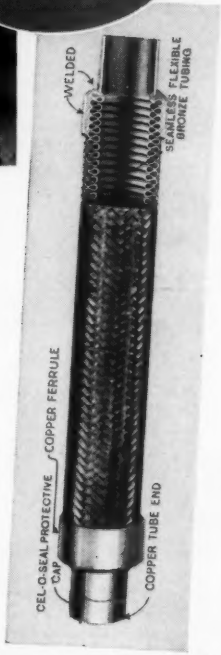
*Stocked by leading supply dealers everywhere, they are quickly available in standard lengths and sizes up to 3"*

HERE is the finishing touch for your refrigeration and air-conditioning installations. American Vibration Eliminators are made of American Seamless Flexible Bronze Tubing with standard wrought copper fittings welded to each end. The welding is done at a temperature above 1,500°F. There is no possibility of weakness developing under the heat you use in soldering.

These better eliminators are leakproof, and are easily soldered as a unit into the regular copper refrigerant line. Their use kills forever the possibility of vibration cracking the refrigerant tubing, and prevents any transmission of noise.

Manufacturers of air conditioning equipment are enthusiastically recommending these eliminators. Contractors tell us they like their ease of installation. American Vibration Eliminators are thoroughly cleaned, dried out and sealed with air-tight, moisture-proof caps.

Write for Bulletin VE-2 describing these quality eliminators. Inquiries regarding unusual applications will receive careful attention. 38311




This type and design of flexible vibration eliminator was first made and marketed by us.

THE AMERICAN BRASS COMPANY

*American Metal Hose Branch*

General Offices: WATERBURY, CONNECTICUT

of the group the necessity of adopting a constitution and by-laws before proceeding with the election of officers. Upon motion of Mr. M. E. Harrison, seconded by Mr. Smoot, the constitution and by-laws of the National Society were adopted by unanimous vote.

It was moved by Mr. Albertsen, seconded by Mr. Harrison, that Claude A. Brunton, first vice-president of the national organization be nominated as President of Tri-State Chapter No. 1. Mr. Smoot moved that the nominations be closed, seconded by Mr. Cottle and Mr. Brunton was unanimously elected.

Mr. Albertsen then turned the chair over to Mr. Brunton and after a short speech of acceptance by Mr. Brunton the election of officers continued and the following members were nominated and elected:

*President*—C. A. Brunton.
*1st Vice-President*—Albert W. Gruber.
*2nd Vice-President*—James Cottle.
*Secretary*—A. W. Albertsen.
*Treasurer*—M. E. Harrison.
*Sergeant-at-Arms*—Wm. H. Wheatley.

Board of Directors: O. H. Rose, Forrest D. Poole, B. DeRond, John Smoot.

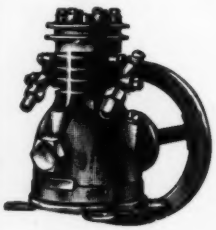
At the request of the President, short talks were given by Messrs. Gruber, Cottle, Wheatley, Albertsen, Harrison, DeRond and Smoot.

Mr. Brunton then called on Mr. Harrison and Mr. Gruber for talks on their impression and the value of the recent national convention to service men. These talks were very finely given and were enjoyed by those present.

A committee on education and membership was then appointed by Mr. Brunton, consisting of: A. W. Albertsen, chairman, M. E. Harrison, B. DeRond and John Smoot.

After some discussion regarding time of regular meetings it was moved by Mr. Albertsen, seconded by Mr. Wheatley, that from the first of October until the first of May the regular meeting nights should be the first and third Mondays of each month, and from May until October monthly meetings should be held the first Monday in each month. This motion was carried by unanimous vote of those present.

After discussion regarding a meeting place, it was decided that the next meeting should be held at the offices of the Air-Ola Radio Company.

**"Chieftain" Quality Built Compressors and Condensing Units**

**are designed to give you many years of quiet. efficient and trouble free service by Engineers who have been serving the refrigeration industry for the last fourteen years.**
**They have again "scored a hit" with a new "V" type four cylinder compressor which is designed for use with ½ to 1 HP motors. All of the advanced features that have proven so successful in "Chieftain" household and light commercial units are now incorporated in this new four cylinder model.**
**Mechanical improvements include, force feed lubrication to piston pin and connecting rod bearings, positive alignment of cylinder bores with main bearings by casting cylinders and crankcase in one piece. Adjustable suction shut-off valve, interchangeable parts with single and twin cylinder models. All compressor parts are machined to precision limits on up to date equipment and assembled in glass enclosed rooms where only filtered, dust free air is admitted.**

***Write for our latest descriptive catalog***

**TECUMSEH PRODUCTS CO., Refrigeration Division TECUMSEH, MICH.**

It was suggested by Mr. Gruber that due to the next regular meeting night being December 20th and falling in Christmas week that this meeting be postponed until Monday night January 3, 1938. This action was approved by those present and so ordered by the President.

A talk on those eligible as associate members was given by Mr. Brunton and members were asked to invite prospective associate as well as active members to attend our meetings.

The application of Jack A. Reeder as an active member was approved and presented by the membership committee and Mr. Reeder was elected to membership.

## THE "CONTRIB'S COLYUM"

*By* THE KINGFISH

### Our New Year Resolutions

THAT we will live up to our title of Refrigeration Service Engineer.

---

That we will faithfully attend all meetings of the R.S.E.S. in 1938.

---

That we will enroll at least one new member in 1938.

---

That we will answer all correspondence promptly.

---

That we will help the officers of the National Society as well as those of our local chapter to make this year a better one.

---

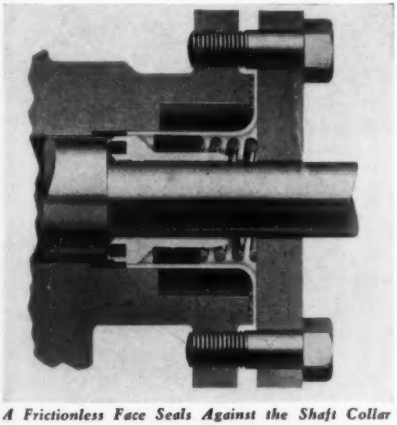
That we will do our utmost to satisfy our customers and do what is right, both towards them and ourselves.

---

That we will do everything we did in 1937 —only better—.

---

We spent a very pleasant Christmas and received a lot of good wishes from many of our friends. Years ago—home on the farm —Christmas eve used to be the night of the big feed—usually consisting of roast goose with all the trimmings—and later the fixing of the Christmas tree and wrapping of presents. The house, all lit up with the old-fashioned kerosene lamps, the candles on the

*A Frictionless Face Seals Against the Shaft Collar*

⅝ Inch No. 20 Seal $3.85, less generous discounts. Fits Refrigerator Compressors with ⅝" Shafts

**THE NEW**

*SYNTRON*

**SHAFT SEALS**

***Stop Leaking Shafts***

***for Once and for All***

▼

**Life tests in actual service have proven their ability to effectively seal worn and scored shafts, as well as new shafts, against vacuum and up to 300 lb. pressures.**

**SELF SEATING—SELF CENTERING—SELF LUBRICATING**

*Order from your Jobber or Direct from Us*

**SYNTRON CO., THOMAS BLVD., HOMER CITY, PA.**

tree, and the red-hot stoves caused a certain fever amongst all of us so there was very little sleeping done that night. Christmas morning at 5 a.m. we were on our way to church—a 3 mile sleigh ride if there was sufficient snow—and immediately after the services we started on a tour of visits to all the neighboring farms. On every farm we had to partake in some form of eats, be it only coffee and cookies, so there was very little appetite when we returned home in the evening and everyone usually went to bed early. On New Year's day we had open house for all the neighbors and again we must eat something with each and every one of them.

Our very best thanks to all of you who remembered us with a pleasant Christmas greeting. It is indeed good to know that one has so many friends inside the R.S.E.S. As our mail carrier said: "'Pears you got friends in every state in the Union."

---

There is a Santa Claus. We received a fine box of stationery from our good friend E. A. Plesskot of St. Louis. Thanks, Pless.

---

And a letter full of cheer from Secretary Edna Christensen.

Herman Goldberg drops us a note after the final "wind-up" of the convention committees and he tells us that he is a little tired out, and can appreciate a rest. Well you did a good job, Herman.

---

McDermott and Paul Jacobsen have also been comparing notes after all the bills have been paid and they find that the convention came out almost as they estimated one year ago after the Memphis show.

They also express great hopes for the future of the Organization.

---

And now our best wishes to all the members of the R.S.E.S. for a very happy New Year. May the year afford you many pleasures, bring you continued good health, and be a prosperous one.

## MEMPHIS AUXILIARY

*By* MRS. "HOOT" GIBSON
333 S. Parkway E.

A NEW YEAR without any hangover from 1937. The Memphis Auxiliary looks back over the old year with no regrets, only pleasant memories of a very

FOR COMMERCIAL USE

Mills Compressors

★ Mills Novelty Company
4100 Fullerton Avenue, Chicago, Illinois

SOLD ONLY THROUGH SERVICEMEN, DEALERS, AND DISTRIBUTORS

happy journey together. Speaking from experience we realize what the ladies that have no Auxiliary have missed during 1937. We have really had lots of fun at our get togethers and watching the fellowship of the members unfold.

In November the ladies drew names for our Christmas party to be in the home of Mrs. Clarence Gilpin and Mrs. Berry McAlister. On arrival at the party each lady placed her gift under the large Christmas tree which was gaily decorated and brightly lighted the living room.

The holiday atmosphere prevailed in the attractive decoration throughout the house. In the center of the luncheon tables were miniature Christmas trees and the Santa Claus place cards further carried out the Christmas theme.

The highlight of the party was the opening of the gifts. As a climax the ladies presented our President with a beautiful table lamp.

Joining our husbands in Christmas Eve revelry at the home of Mr. and Mrs. Frank Weidlein, the center of attraction was again a large green cedar Christmas tree lighted and ornamented in bright colors in one corner of the living room. Santa Claus making his rounds was attracted by the whoopee of the party, dropped in and presented each with a novel trinket, which created much merriment. Cake and coffee were served by our lovely hostess.

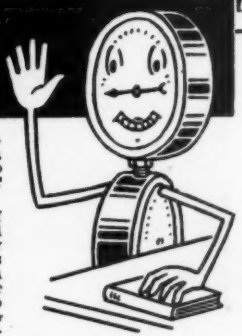
## D. A. CANT DISTRICT MANAGER FOR GILMER IN OKLAHOMA

THE L. H. Gilmer Co. announces the appointment of D. A. Cant as district manager for the State of Oklahoma on the company's line of belts for electric refrigerators, household washing machines, pumps, woodworking machines, as well as for commercial drives, small and large. He makes his headquarters in Tulsa.

Carlton Mickel,
New York.

Enclosed find a money order for $2.00, for which please send THE REFRIGERATION SERVICE ENGINEER another year. I do not want to miss a copy, for I think this is the most helpful magazine on the market. I really think every serviceman should subscribe for it.


"THE WHOLE TRUTH—
and nothing but the truth"



High Pressure

WHEN the pointer of a Marsh Ammonia Gauge comes to rest you can rely on its testimony . . . and, thanks to the Marsh Recalibrator, you can KEEP IT HONEST!

When a Marsh gauge is knocked out of adjustment you don't pull the hand off and set it back to zero—a practice that merely corrects a gauge at the zero point and fails to correct it at other points. All that you do is simply turn the Marsh Recalibrator screw until the gauge is correct at zero and this patented feature resets the gauge throughout its entire range—truly re-calibrates it.

Low Pressure

These Marsh gauges for refrigeration work have many other superior features such as the patented stabilizer that protects against sudden shocks, and the patented dial arrangement which provides easily read 1 lb. divisions in the low pressure operating range.

Write for complete information about these gauges and other Marsh instruments.

JAS. P. MARSH CORPORATION
2059 Southport Avenue CHICAGO, ILLINOIS

MARSH Refrigeration Instruments

## ONTARIO MAPLE LEAF CHAPTER

### Meeting of November 12, 1937

*By* H. F. NYE, *Secretary*
80 Ontario St., Toronto, Ont., Canada

MEETING was called to order at 8:50 p.m. at the King Edward Hotel, with all officers present. On motion of Mr. Smallwood, seconded by Mr. R. Turner, the minutes of previous meeting were accepted as read.

Mr. Harry Parrish introduced to the meeting a number of out-of-town visitors who are engaged in refrigeration service work and who will be likely prospects for membership.

A brief report of finances was read by the treasurer.

Mr. Sneath read a report on general business meeting of the national convention. Mr. Frayne read a report on exhibits at the convention. Mr. Weaver read a report on speeches heard at convention. Jas. Spence reported on a meeting with the manufacturers. C. W. Moore reported on banquet and other entertainment features of the convention. Frank Strong, as appointed delegate, made a general report on elections and other business items of the convention. Benny Potts reported on reception accorded to Canadian delegates. Mr. Burns reported on meeting of National Board of Directors. H. F. Nye briefly reported on jobbers' meetings.

Ross Turner as Chairman of Educational Committee reported on future plans of educational committee and advised that arrangements were being made for a number of speakers during the coming season.

It was moved by Mr. Weaver, and seconded by Mr. Parrish, that Mr. Paget of Montreal, a guest of the evening, be invited to organize a chapter of the R.S.E.S. in Montreal and the same invitation be extended to Mr. Cunningham of London, Ontario, also a guest of the evening, and the secretary was instructed to write the National Secretary requesting that an invitation from National Headquarters be extended to these two gentlemen.

Mr. Burns spoke briefly on the subject of certificate membership and advised that this subject was of much interest at the National convention. It was moved by Mr. Spence

Send today for HARRY ALTER'S
DEPENDABOOK
The latest and finest in refrigeration and air conditioning parts, tools and equipment.
• Our large stocks permit prompt shipment at lowest prices.
1938
DEPENDABOOK
EVERYTHING FOR
REFRIGERATION
IN 1938
THE HARRY ALTER CO.
Just Off The Press!
If you have not received your latest 1938 copy of the Harry Alter DEPENDABOOK, write for it today on your letterhead.
BRANCHES: NEW YORK—CLEVELAND—ST. LOUIS
THE HARRY ALTER CO.
1728 SO. MICHIGAN AVE.—CHICAGO, ILL.

and seconded by Mr. Jaeger that Mr. Burns appoint a committee to assist in gaining information on certificate membership.

### Other Chapters Discussed

Mr. Dawson addressed the meeting on the subject of forming other chapters in Ontario and suggested caution against organizing too many chapters which might tend to split the organization into too many small locals and thereby create difficulties which might be detrimental to the organization as a whole.

It was moved by Mr. Weaver and seconded by Mr. Smallwood and duly carried that arrangements be made to hold a regular meeting in Hamilton on the fourth Friday of January, 1938.

Mr. Doan thanked Mr. Parrish for introducing the visitors and for his interest in the organization.

Mr. Roberts extended an invitation to hold the next regular meeting at the new premises of the Universal Refrigeration Co., 593 Adelaide St. West, and it was moved by Mr. Marshall and seconded by Mr. Sneath that the invitation be accepted.

## MISSISSIPPI VALLEY CHAPTER

**Meeting of December 10, 1937**

*By* **E. L. BENGSTON,** *Secretary*
**116 E. First St., Davenport, Iowa**

THE regular meeting of the Chapter was opened by the President, Lonnie Fish, following which he introduced the educational speaker of the evening, Mr. Marc Shantz, manager of the Chicago branch of the Fedders Manufacturing Co., Inc.

Mr. Shantz had a demonstrating board with him describing the operation of Fedders thermostatic expansion valves. He gave a very interesting talk on Fedders valves and commercial coils. When the meeting was open for discussion Mr. Shantz gave the members a lot of information on commercial coils. Each member was well repaid for having come out to the meeting.

The business session followed and roll call was taken. The minutes of the previous meeting and the treasurer's report were read by the Secretary. Both reports were approved as read.

As the next regular meeting night would fall on Christmas Eve, Mr. Nelson made the

**Snap-on**

**SPECIALIZED TOOLS FOR REFRIGERATION SERVICE**

When it's "hurry, *hurry*, HURRY" from one service call to another . . . here's the tool set that gets you around on time. Developed over a period of years when we have been privileged to work with a number of leading manufacturers of Refrigeration and Air Conditioning equipment. Tested in the field by hundreds of service engineers. Available only through our own branch distributing warehouses located in 37 principal cities.

**R-200B SET**

One piece forged ratchet with ¼" square opening for work on valve stems. 1½" extension, 2 adaptor plugs, 1 Kerotest valve packing nut socket, 5 square valve stem sockets, 5 packing gland nut sockets and 3 double-broached Ferret sockets. Complete in metal box $9.90.

SNAP ON TOOLS CORPORATION
KENOSHA, WIS.
☐ FREE Literature
☐ Show me Set R-200B
Name .....
Address .....
RSE-1

motion, seconded by Mr. Balke, that this meeting be omitted and the society meet on the second Friday of January.

The motion was made by Mr. Willetts and seconded by Mr. Nelson that election of officers be held at this January meeting and that new officers be installed immediately upon their election. Mr. Ford made the motion, seconded by Mr. Wolcott, that the President nominate three members to serve on the Nominating Committee and that two men should be selected to run for each office. The three members appointed on the Nominating Committee are as follows:

E. J. Ford, Kewanee, Illinois.
E. L. Bengston, Davenport, Iowa.
A. B. Munchrath, Davenport, Iowa.

Mr. Ford made the motion, which was seconded by Mr. Balke, that we have with us at the meeting on the second Friday of February the Penn Electric Switch Company representative who will have a demonstrating board with him.

The President read a letter which was received from Mr. Harvey Burgess of Joliet, who is a member of the Tri-County Chapter No. 1, to the Illinois members with regard to an Illinois R.S.E.S. State meeting on Monday, December 13th. However, nothing was decided on this matter.

Mr. Marc Shantz advised members that he would mail out to them the booklet published by Mr. Joe Askin.

The question box was opened and quite a lengthy discussion followed.

## CENTRAL NEW YORK CHAPTER

**Meeting of December 13, 1937**

*By* **F. G. MACKIN,** *Secretary*
**615 Caleb Ave., Syracuse, N. Y.**

THE meeting was called to order by First Vice President Paul Cross and the Secretary's report was read and accepted.

Mr. Persett, who is acting on the Code Committee, read an article on the Memphis code, which was followed by a lengthy discussion.

There was also some discussion in regard to service rates in Syracuse, which this chapter had previously set at $2.00 per hour.

The following officers were elected for 1938:

*President*—H. A. Persett
*First Vice-President*—Carl Stewart

**WHY ISN'T JOE ON THE JOB?**

**Home, Sick, Eh!**
**Sore Throat, Eh!**
**Under Doctor's Care, Eh!**

Just when service calls are heaviest something happens to put the star service man on the sick list.

In the refrigeration field that "something" may well be the accumulated effects of more or less numerous exposures to irritating fumes.

**Fumes Are Enemies**

of the delicate throat and lung tissues, and while the consequences of carelessness may not appear for a space, be sure they will show up in the end—to cost somebody something.

**HEALTHGUARD FUME KIT**

is safe, light, compact, durable, inexpensive and COMFORTABLE. It will catch on and pay its way in the right way—by preventing waste of time and cash. Let us send you details and prices.

**CHICAGO EYE SHIELD CO.**
**2341 Warren Boulevard** **CHICAGO, ILL.**

*Second Vice-President*—Bernard Augins
*Secretary*—M. H. Schwartzberg
*Treasurer*—Paul Cross
*Sergeant-at-Arms*—Bert Goodhue

S S S

## MISSOURI VALLEY CHAPTER

**Meeting of November 26, 1937**
*By* **T. R. CHERRY,** *Temporary Secretary*
**416 S. 17th St., Omaha, Nebr.**

A MEETING of the service engineers of Omaha was held at 8:15 p.m., Friday, November 26th, at the Elks Club. The purpose of this meeting was to determine whether the service engineers of Omaha and vicinity wanted to start an Omaha chapter of the Refrigeration Service Engineers' Society.

The meeting was called to order by Mr. Austin Jones, who gave a short informal address and who then introduced Mr. H. T. McDermott, national secretary of the Society.

Mr. McDermott gave a very thorough explanation of the aims and purposes of the national organization. He told us of his connection with the organization and just what affiliation with the national organization could do and has done for the refrigeration service engineer. At the end of Mr. McDermott's talk he asked that a vote be taken to see if the men present wished to start a chapter of the society in Omaha. The vote taken was unanimously in favor of organizing a local chapter. Austin Jones thanked Mr. McDermott for coming to Omaha to help organize a chapter here and then called for nominations for a temporary chairman to take charge until the charter is received and the permanent officers can be elected.

Mr. C. J. Doyle was unanimously selected as a temporary chairman. The newly elected temporary chairman called for nominations for treasurer and Mr. Ralph Walbridge was elected. Nominations for temporary secretary resulted in Mr. T. R. Cherry being elected.

The petition for a local charter was placed in the hands of the temporary secretary and he with the temporary treasurer proceeded to pass out applications for membership in the national society. Each one in attendance who filled in and signed an application and who turned over the initiation fee of $2.50 to the treasurer was allowed to sign the petition for charter. Twenty applica-

TRIPLE-TROUGH
Positive Coil Drip Prevention
Unusually deep primary trough. 1
Air insulated second trough. 2
Air insulated third trough designed to act as a final precaution against any drip. 3
The Ultimate in Temperators by
KRAMER
TRENTON AUTO RADIATOR WORKS, Trenton, N.J.
NEW YORK
PITTSBURGH

tions with the initiation fee were received and ten applications were turned in upon which future initiation payments would be made.

The chairman then called on Mr. McDermott who accepted the petition for a charter, answered a few questions and expressed his thanks to the United Supply Company for the efforts and work that was put forth in getting this local chapter organized.

The chairman appointed E. C. Hamilton, D. W. Schuneman and Frank Williams as a Membership Committee. The membership committee was appointed to work with the temporary officers in securing additional members and in passing on applications for membership. The chairman called for an opinion on when the next meeting should be held and it was decided that Thursday, December 2nd, was agreeable to the assembly.

The chairman announced that there were beer and pretzels to be had after the meeting with the compliments of the United Supply Company and called for a motion for adjournment. The motion was made and the meeting adjourned.

**Meeting of December 2, 1937**

The meeting was called to order by the chairman, Mr. C. J. Doyle, who called upon the treasurer, Mr. R. C. Walbridge to call the roll. Mr. Walbridge read the names of the applications he had received and asked those present to identify themselves by repeating their names and giving their affiliation with the industry.

The chairman explained that the object of this, the second meeting, was to act as a closing meeting for charter membership applications and to bring up for discussion various questions which had arisen since the first meeting.

The treasurer reported that he had received, up to date, $105.00 in paid applications.

Mr. Schuneman asked that the constitution and by-laws of the national association be read. A portion of the constitution and by-laws were read and a general discussion took place.

A motion was made by Austin Jones that the group authorize the treasurer to purchase a "Roberts Rules of Order," for the use of the local group. He stated that the cost would be $1.50. This motion was seconded by Mr. Schuneman.

Mr. Cherry asked the chairman to call upon the various jobbers' representatives


GET Gilmer "V"'S

GILMERS FIT

Go to Gilmer and find fits faster. Gilmer V-Belts are "tailor-made in the grooves" on the world's largest assortment of V-moulds. They come in more sizes, for more models and more makes. Your Gilmer jobber carries complete stocks, ships promptly, gives you the speed you need. Don't lose time and profits waiting. *Go to Gilmer!*

FREE 120-page Gilmer Catalog—Send today

L. H. GILMER COMPANY, Tacony, Philadelphia

THE OLDEST FIRM OF RUBBER FABRIC BELT SPECIALISTS

that were present to explain their position in this society: Mr. Schaffer, Mr. Noll and Austin Jones satisfied the group as to their positions in the society.

A motion was made by Austin Jones and seconded by Mr. Schuneman that the next meeting be for charter presentation and that it be held on December 16th, at which time the National Secretary, Mr. H. T. McDermott should be present. The motion was carried.

Secretary T. R. Cherry asked the chairman to appoint a secretary to act the night of December 16th, as Mr. Cherry could not be present. The chairman appointed Mr. Hart to act as secretary the night of December 16th.

S S S

## MISSISSIPPI VALLEY CHAPTER HOLDS BANQUET

THE Hollywood Supper Club was the scene, and December 14th the date, of the highly successful Mississippi Valley Chapter banquet and dance.

Unfortunately the weather was very bad and the roads dangerously slippery, which prevented many out-of-town people from attending. However, the Teagardens from Galesburg and the Rittenhouses from Muscatine braved the elements and were amply rewarded with a good time.

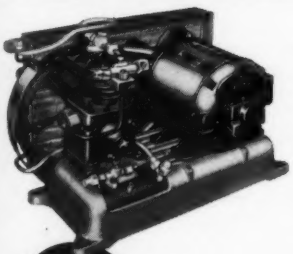
The chicken dinner was enjoyed by all including Bill Cawiezell who, much to the embarrassment of Mrs. Bill, wore a pair of angora gloves while he ate just to keep his hands from getting greasy. We are wondering why he didn't wear ear muffs also to protect his ears.

Proof of his "business before pleasure" policy was the late arrival of Mr. and Mrs. Cy Kaufman. A service call caused the delay.

Chairman of the Entertainment Committee, A. B. Munchrath, did a swell job of being master of ceremonies. Favors for all such as sachets in a little wicker basket for the ladies, balloons and paper hats, made a big hit. As the party warmed up someone got the idea of putting water in the balloons and throwing them; however, no one got wet and all turned out well.

During the course of the evening the ladies retired to a room adjoining to discuss the desirability of forming a ladies auxiliary. A vote taken revealed about twenty of those present were in favor of it.


for Service Replacement & New Installations



M & E Bare Compressors and complete units, available with or without motors and controls, meet every need of the Assembler or Service Company with high quality, moderately priced.

One, two and four cylinder models for $SO_2$, $CH_3CL$ and F-12. 1/6 h.p. to 20 h.p.

Write for new catalog — a valuable reference.

M&E EST. 1866

MERCHANT & EVANS COMPANY

Philadelphia, Pa., U. S. A., Plant at Lancaster, Pa.

The three newspapers of the Tri-Cities carried news items of the affair the following day.

## CAPITAL CITY CHAPTER

**Meeting of November 17, 1937**

*By* M. H. HAMILTON, *Secretary*

1522 Isherwood St., N. E., Washington, D. C.

MR. E. J. UHTHOFF, the vice-president, called the meeting to order in the absence of President Matheson. Minutes of the October 20th meeting were approved as read.


**Don't Wish for Success**
**TRAIN FOR IT**

U.E.I. training in Electric Refrigeration provides just the knowledge you need. It is interesting, thorough, practical, authentic. You study at your convenience in the privacy of your home.

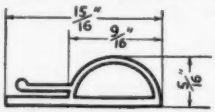
Place yourself head and shoulders above rule of thumb mechanics. Be a technically trained Refrigeration Technician.

Interesting and valuable facts FREE for the asking. Write today.

**UTILITIES ENGINEERING INSTITUTE**
404 N. Wells St., Chicago
17 W. 60th St., New York, N. Y.



**Insist on JARROW Replacements**




646

● The gasket illustrated was made especially for Apex replacement. It fits. All JARROW gaskets are built to manufacturer's specifications.

JARROW PRODUCTS CORPORATION
420 N. LaSalle St., Chicago, Ill.



**REPLACEMENT GASKETS FOR ALL MAKES**

Metallic Gaskets that hold regardless of what the refrigerant may be and will not shed particles of material to clog up important working parts in a machine.

*Send for catalog listing many "orphans" not available elsewhere.*

**CHICAGO-WILCOX MFG. CO.**
7701 S. AVALON AVE., CHICAGO, ILL.


Communications from National Secretary H. T. McDermott, National President W. H. Moss, H. D. Busby, chairman of the Chicago Chapter Educational Committee and Mr. Herman Goldberg were read.

The two labor survey forms were given to Mr. Uhthoff and Mr. Miller to study and fill in and return to the Secretary at their earliest convenience.

Mr. H. M. Miller and Mr. M. H. Hamilton, delegate and alternate, respectively, gave reports on the convention, as well as an account of their expenses.

A report was given by Mr. Miller to the effect that he had contacted men from various companies while at the convention to give us lectures at later dates.

Mr. Uhthoff said he had contacted a man from Frigidaire to give a lecture. The Educational Committee was instructed to go ahead with plans for our educational meeting the first part of December.

The meeting adjourned and then followed a round-table discussion about various matters of interest to the members.

## CENTRAL INDIANA CHAPTER

**Meeting of November 24, 1937**

*By* FRANK D. WHETSEL, *Secretary*

321 Milton Ave., Anderson, Ind.

THE meeting was opened promptly at 8:00 p.m. Minutes of the previous meeting were read and approved. A motion was made to hold meetings alternately in Marion and Anderson in an effort to secure more members and to have a better attendance at the regular meetings. A motion was also made to postpone the January banquet meeting until further notice.

The business meeting was taken up with the discussion of the snap-action valve. A very interesting and educational drawing and lecture was given by Mr. Paul Jacobsen on the operation and adjusting of the valve. At the end of the lecture questions were asked and answered to everyone's satisfaction.

The balance of the evening was taken up with discussion of the December 1st meeting with the Indianapolis Chapter to be held at the Indiana General Service Co. Bldg. It was made known that a speaker on evaporative condensers would be present for the occasion.

**Meeting of December 1, 1937**

This meeting was held in the Indiana General Service Co. Building at Marion,

Ind., in conjunction with the Indianapolis Chapter. The meeting was opened by President Vern Nold who turned the meeting over to Mr. Paul Jacobsen, chairman of the Educational Committee.

Mr. Jacobsen introduced as the speaker Mr. C. R. Kranz, of the Binks Manufacturing Co. of Chicago, who gave a very interesting and educational lecture on the application of water towers in the refrigeration industry.

Succeeding Mr. Kranz to the speaker's stand was Mr. Carl Barney, the mayor of Marion. Mr. Barney complimented the society on their splendid organization and gave his version of the need of water saving devices as would apply to his city and other cities having a heavy load on their water supply during the hot months of the year.

Following Mr. Barney's speech refreshments were served to all present by the banquet committee. Special thanks were given to Mrs. Paul Jacobsen, Mrs. Vern Nold, and Mrs. R. W. Morris who prepared the refreshments and served them to all attending.

After refreshments were served talks were given by Mr. William Drake, president of the Indianapolis Chapter, inviting every one to a dinner-dance to be held at Indianapolis Dec. 15th. He also thanked the Central Indiana Chapter for their invitation and congratulated them on their rapid growth in the Society.

Mr. Scotty of the Kiefer Supply Co., Indianapolis, gave a very interesting talk on his idea of the society and its members.

Following the speeches, each one present stood up and introduced himself to the rest of the members.

Mr. Jacobsen, chairman of the Educational Committee, explained to those present who were not familiar with the Society and its purpose, the birth of the organization and its purpose in the refrigeration industry.

There were forty-six present, representing the cities of: Indianapolis, Anderson, Marion, Kokomo, Wabash and Chicago.

The meeting adjourned at eleven-thirty and a good and profitable time was had by all.

* * *

## PITTSBURGH CHAPTER

### Meeting of December 10, 1937

*By* F. V. GOLITZ, *Secretary*
1109 Pemberton St., Pittsburgh, Pa.

THE regular meeting of the chapter was held on December 10th in the Common-

AIR CONDITIONING AND REFRIGERATION

"KEEPING STEP WITH INDUSTRY"

That is the function of this reliable school that prepares men properly for the Air Conditioning and Refrigeration field.

A resident school that meets every requirement of the industry in its practical and technical training. Superbly equipped—9000 square feet of laboratories and classrooms. Day and Evening Courses. Request Booklet T.

Attention Employers!

CALL ON US FOR THE MEN YOU NEED! OUR FILES OF COMPETENT MEN ARE AVAILABLE. NO FEES TO EITHER EMPLOYER OR EMPLOYEE. . . .

TECHNICIANS INSTITUTE
244 WEST 14th STREET NEW YORK

DENNIS GASKETS FOR ALL MAKES REFRIGERATOR DOORS

A complete line of rubber - coated, packed Gaskets and extruded rubber Gaskets that last longer —retain higher efficiency—because made of finest materials and workmanship. Write for free samples, giving your jobber's name and address.

W. J. DENNIS & CO.
2110-20 WEST LAKE ST. CHICAGO

Consider BLYTHE your Stock Room

Immediately available to supply your refrigeration and air conditioning supplies — wholesale only. .

PARTS A complete line of standard parts carried in stock at all times

TOOLS Everything you need to do a better and faster repair job

SUPPLIES The best there is on the market Write for catalog

H. W. BLYTHE CO.
2334 S. Michigan Ave., Chicago

*Featuring:* the leading lines of Refrigeration, Air Conditioning and Heating Supplies, Parts, Tools and Equipment of Responsible Manufacturers.

WHOLESALE ONLY

**H. CHANNON CO.**

133 N. Wacker Drive, Chicago

**Cold Controls & Expansion Valves**

**repaired or exchanged at the following prices—F.O.B. Chicago**

| | |
|---|---|
| Automatic Expansion Valves (All Makes) | $1.25 |
| Thermostatic Expansion Valves | 3.00 |
| Automatic Water Valves | 2.50 |
| Domestic Cold Controls (Modern Type) | 2.00 |
| Commercial Controls (Temp. or Pressure) | 2.50 |
| Commercial Dual Controls | 3.00 |

ALL WORK GUARANTEED FOR 90 DAYS

**NEW DUTY**

2424 Irving Park Blvd., CHICAGO

wealth Building, 316 Fourth Ave.

In the absence of John Kirch, Vice-President E. V. Black presided. The minutes of the November meeting were approved as read by the Secretary.

The Nominating Committee reported the receipt of a letter from John Kirch withdrawing his name as a candidate for President. It was moved by C. O. McCauley, seconded by N. D. Wagener that the election be held at this meeting and the balloting be by secret ballot.

Nominations from the floor for the Board of Directors were: C. O. McCauley, N. D. Wagener and W. H. Barnes.

The result of the election was as follows:

*President*—E. V. Black.

*Vice-President*—V. C. Waight.

*Secretary-Treasurer*—F. V. Golitz.

*Sergeant-at-Arms*—A. R. Olmsted.

*Board of Directors:* C. O. McCauley, John Barbagallo and N. D. Wagener.

L. R. Koontz invited the members to visit the warehouse and refrigerating plant of the A&P Grocery Company. Motion by John Barbagallo and seconded by C. Bondzelske that the invitation be accepted and the visit be made on the next meeting night was carried.

S S S

R. H. Albright,
Arkansas.

Enclosed you will find $2.00 for next year's REFRIGERATION SERVICE ENGINEER, which I could not be without.

S S S

## CHICAGO CHAPTER

### Meeting of November 23,1937

*By* WILLIS STAFFORD, *Secretary*
726 Hinman St., Aurora, Ill.

A LETTER from the Kansas City Chapter was read complimenting us on the convention. A motion from the floor instructed the President to answer the letter.

Discussion on the forming of a state chapter: Mr. Stafford reported the chapters at Rockford and Tri-County are in accord with the plan to form a state chapter. Mr. Monjian believes that we should wait until after the new officers are elected before any definite action is taken. Mr. Vanston believes the organization should be formed at once. A motion by Mr. Monjian, seconded by Mr. Schroeder, was carried that the chairman

NEW

Fast
Direct
Cooling

**COLTROL D-X**

**LIQUID COOLER**

In the new COLTROL D-X the refrigerant contacts the coils directly—the fastest method of cooling, with the least temperature lag—Simple to install, easy to service. No moving parts.

**COMMERCIAL COIL & REFRIGERATION CO.**
**459 North Artesian Avenue, Chicago, Illinois**

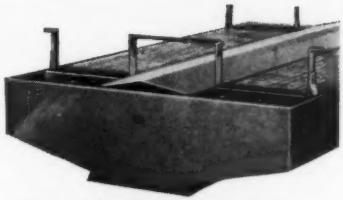
**. . SEE YOUR JOBBER OR WRITE DIRECT . .**

# You MUST

have correct air circulation for correct cooling in a Walk-In Cooler. The Rempe

# AUTODRAFT

is designed for positive circulation and maximum cooling. Write for interesting data.



**REMPE COILS**

340 N. Sacramento Blvd., CHICAGO


appoint a committee to investigate and that no action be taken until after the first of the year.

Mr. Stafford introduced Mr. Eugene White of Elgin. Mr. White extended an invitation to our chapter to attend a joint meeting in Elgin with their chapter and other chapters in the state. The date of this meeting is December 13th. Mr. White complimented the Chicago Chapter on the convention. A motion by Mr. Goldberg, seconded by Mr. Vanston was carried that we accept the Tri-County Chapter's invitation.

The chair appointed Mr. Stafford and Mr. Monjian as a committee to investigate the possibilities of a state chapter.

Mr. Goldberg made a motion that the Entertainment Committee secure a bus for the members to ride to the meeting at Elgin, and that they have full power to plan any other necessary entertainment at that meeting.

Mr. Goldberg told of attending a meeting in Davenport. They are planning a state chapter in Iowa, possibly an organization of our two states, inasmuch as there are many Illinois members in the Davenport Chapter.

Mr. Goldberg gave a final report of the convention committee. About $350.00 will be turned over to the chapter treasury. The exhibits were almost up to our long planned expectations. There was a paid registration of over 800 people, and a total attendance in excess of 2100. Reports on a questionnaire sent out to the exhibitors indicates 95% satisfaction. A motion by Mr. Bossert seconded by Mr. Monjian was carried that we accept Mr. Goldberg's report.

Upon a motion by Mr. Monjian, a standing vote of thanks was given to Mr. Goldberg.

President Skipple discussed the unfinished business of the chapter that will be turned over to the new officers; namely, future educational programs, certificate membership exams and the state chapter organization.

Mr. Monjian reports Master's Association will cooperate 100% in 1938.

A motion by Mr. Drownes, seconded by Mr. Monjian that we have a short meeting on Dec. 13th, before the joint meeting at


QUICK SERVICE

PARTS · SUPPLIES · TOOLS
*for Refrigeration-Air Conditioning*

DEPENDABLE ITEMS FOR ALL YOUR NEEDS

*Save Money and Time—Complete Stock Assures Prompt Service*

WRITE TODAY for NEW CATALOG

Airo SUPPLY COMPANY
CHICAGO: 2732 N. ASHLAND AVE.
NEW YORK: 17 WEST 60th ST.

LOOK AT THE PLUS + VALUE OF Artic
REG. U.S. PAT. OFF.
(DU PONT METHYL CHLORIDE)

1. Small volume displacement per unit of refrigeration permitting the use of small, compact equipment.
2. Not corrosive to ordinary equipment.
3. Operates at positive pressures, even at sub-zero temperatures.
4. Fast cooling and quick freezing.
5. Gives controlled low temperatures easily and efficiently.
6. Thermally stable and does not decompose at any temperature existing in the refrigeration system.
7. Has low head pressures, adaptable to air-cooled condensers and light-weight equipment.
8. Economical power.
9. Handled, serviced with ease.
10. Easy to "hold" — comparatively low leakage.
11. Easy to engineer—no unusual design problems.

**ARTIC**—*the Preferred Methyl Chloride for Service Work*

DU PONT
REG. U.S. PAT. OFF.

**E. I. DU PONT DE NEMOURS & CO., INC.**
The R. & H. Chemicals Dept., Wilmington, Del.

Elgin, was carried. This will be the last meeting of the year.

**Meeting of December 13, 1937**

Since this meeting was held in conjunction with the Tri-County and Rockford Chapters it was made as brief as possible. After reading of the minutes the following correspondence was read:

Dear Members of the Chicago Chapter:

I have returned home from one of the most memorable conventions in the annals of the Refrigeration Service Engineers' Society and want to take this opportunity to send my compliments to the Chicago Chapter for the extraordinary efforts they put forth to make this annual meeting a success.

You gentlemen have every reason to be proud of the achievement and you are entitled to the highest praise.

I am indeed proud to remember that I was National President this year, and that I also was one of the pioneers in your chapter.

Allow me to congratulate you, and wish you success for many years to come.

Sincerely yours,
Paul Jacobsen,

Dear Mr. Stafford:

Now that I have time to get things in order, it seems high time that I let you know what I think of the splendid job your chapter did at our recent convention; it was outstanding to say the least, and when better conventions are held, Chicago will hold them.

Enough praise cannot be given your General Chairman, Mr. Herman Goldberg, and his many co-workers. No doubt you are glad it is over, but you have the right to feel proud of a job well done. I shall not soon forget the many courtesies extended me, and in the event I can ever serve you in any way, do not hesitate to call on me.

With kindest personal regards to my many friends in Chicago, I am,

Sincerely yours,
E. A. Plesskott,

The meeting then adjourned to the joint meeting with the Tri-County and Rockford chapters to discuss the plans of forming a state chapter.

S S S

Richard Kuester
New York

As a subscriber, I am enjoying your publication and find the material very interesting and educational.

## BOOK REVIEW

**Trane Air Conditioning Manual, by William Goodman. 307 pages, plus 86 pages of questions and problems. Size 8½ x 11, leather loose-leaf ring binder. Price complete, $5.00. Published and for sale by The Trane Co., LaCrosse, Wis.**

TO collect, coordinate, organize, and to make comprehensible and available the store of knowledge on air conditioning, is the function of the new Trane Air Conditioning Manual.

Representing an investment in excess of $40,000, and a careful painstaking task of over three years, the Manual is presented as an all-inclusive, useful, scholarly, and utterly new contribution to a great and growing industry. All available information on the science and practice of air conditioning was assembled and sifted, its inadequacies and shortcomings noted, and only the factual, tested data from this confused mass of material retained. So we are informed by The Trane Company.

The book is presented in the form of a training manual, with a section after each chapter devoted to questions and problems. Well interspersed with useful tables and illustrations which clarify the meaning so well, the subject is treated in a simple and easily understandable manner, in a total of seven chapters.

## GEORGE H. CLARK NOW WITH DETROIT LUBRICATOR CO.

MR. GEORGE H. CLARK, chairman of the National Educational and Examining Board of the Refrigeration Service Engineers Society, has recently been appointed Refrigeration Engineer for the Detroit Lubricator Co., Detroit, Mich.

Mr. Clark brings to his new position a background of technical and practical experience based on many years of active work in the refrigeration industry. After graduating from the University of Michigan with a Mechanical Engineer's degree, he was employed by the Underwriters' Laboratories, as Assistant Engineer of the Casualty and Automotive Department. Following this experience, Mr. Clark entered the engineering department of Copeland, and later was with the Accessories Division of the American Radiator Co.

Recognizing the growing demand for independent refrigeration servicing, the company of Mercier and Clark was founded in

GEO. H. CLARK

Detroit, and was one of the large independent refrigeration service companies in that city. It was natural that Mr. Clark's interest in educational and laboratory work in refrigeration should recognize the necessity for properly trained men, desiring to enter the refrigeration industry. He, therefore, founded the Detroit School of Refrigeration, which he supervised until his recent affiliation with the Detroit Lubricator Co., where he assumes the duties formerly handled by Mr. Dan D. Wile, resigned.


**TRY THIS THERMOMETER ON 15 DAY TRIAL**

● Here is a reliable recording thermometer at a price you can afford. Only $18! Designed particularly for service work. You must see it to appreciate its exclusive features; to learn why it is easy to operate. Hundreds use Practical thermometers to check refrigerators, air-conditioners, etc. Find out all about this instrument. Ask your jobber or write to us.

**SEND FOR TRIAL OFFER**

Mail this ad with your letterhead to get latest folder on this amazing instrument and 15 Day Trial inspection offer.

**PRACTICAL** Recording Thermometer

**Practical Instrument Co. 2717G N. Ashland, Chicago**

# Index to Advertisements


Airo Supply Co. ..... 59
Alco Valve Co. ..... 2
Alter Co., The Harry ..... 50
American Metal Hose Branch of American Brass Co. ..... 45
Ansul Chemical Co. ..... 64
Automatic Products Co. ..... 3

Blythe Co., H. W. ..... 57
Bonney Forge & Tool Wks. ..... Back Cover

Channon Co., H. ..... 58
Chicago Eye Shield Co. ..... 52
Chicago-Wilcox Mfg. Co. ..... 56
Commercial Coil & Refrigeration Co. ..... 58

Dennis & Co., W. J. ..... 57
Detroit Lubricator Co. ..... 6

Fedders Manufacturing Co. ..... 32 and 33

Gilmer Co., L. H. ..... 54

Henry Valve Co. ..... Inside Back Cover

Imperial Brass Manufacturing Co. ..... 00

Jarrow Products Corp. ..... 56

Kerotest Manufacturing Co. ..... 00

Marsh Corp., James P. ..... 49
Merchant & Evans Co. ..... 55

Miller Rubber Co. ..... 00
Mills Novelty Co. ..... 48
Minneapolis-Honeywell Regulator Co. ..... 00
Mueller Brass Co. ..... 43

New Duty ..... 58

Peerless of America, Inc. ..... 42
Practical Instrument Co. ..... 61

Ranco, Inc. ..... 4
R. & H. Chemicals Dept. ..... 60
Rempe Co. ..... 59
Revere Copper & Brass, Inc. ..... 00
Rotary Seal Co. ..... Inside Front Cover

Skinner Chuck Co. ..... 64
Snap-On Tools, Inc. ..... 51
Syntron Co. ..... 47

Technicians Institute ..... 57
Tecumseh Products Co. ..... 46
Trenton Auto Radiator Works ..... 53

Utilities Engineering Institute ..... 56

Virginia Smelting Co. ..... 41

Weatherhead Co. ..... 1
Wolverine Tube Co. ..... 00

Zenith Carburetor Co. ..... 62



USE THE ZENITH REFRIGERANT FILTER

. . . FOR SULPHUR DIOXIDE, FREON OR METHYL CHLORIDE REFRIGERATORS

BECAUSE Zenith elements provide finer spacings (.002") than any asbestos sack or wire screen filter.

*Easily installed—Easily cleaned*
*Permanent Protection*
*No Wool or Asbestos to Rot and Wear Out*
*Corrosion Proof—Leak Proof*
*Ample Capacity*

Positive protection against dirt in Expansion Valves, Solenoid Valves, Capillary Tubes and other liquid control devices.

ZENITH CARBURETOR COMPANY
*Subsidiary Bendix Aviation Corp.*
DETROIT, MICHIGAN

Engineered Refrigerant Filters in a variety of sizes for varying capacities.

# Want *Information*?

## Use The R. S. E. SERVICE DEPARTMENT

### —It's for Your Convenience

THIS department is conducted for the convenience of our subscribers. We will ask the manufacturers and distributors to send you the latest information on the items checked.

- ☐ Belts
- ☐ Blow Torches
- Blowers (see Unit Blowers)
- ☐ Books
- ☐ Brushes, Motor
- ☐ Bushings, Motor
- ☐ Carbon Tetrachloride
- ☐ Charging Hose
- ☐ Charging Stand

- Coils
  - ☐ Fin
  - ☐ Pipe
- ☐ Compressors
- Condensers
  - ☐ Air Cooled
  - ☐ Water Cooled
- ☐ Condenser Water Regulators
- ☐ Connecting Rods

- Controls
  - ☐ Cold
  - ☐ Humidity
  - ☐ Liquid Level
  - ☐ Pressure
  - ☐ Temperature
  - ☐ Thermostatic
  - ☐ Water
- ☐ Domestic Evaporators
- Dehydrants
  - ☐ Activated Alumina
  - ☐ Calcium Chloride
- ☐ Dehydrators
- Door Seals (see Gaskets)
- ☐ Drums, Service
- ☐ Dryers

- Evaporators
  - ☐ Dry
  - ☐ Flooded
- ☐ Fan and Pulley Assemblies

- Filters (see Strainers)
- ☐ Float, High Side
- ☐ Float Valve Seats

- Fittings
  - ☐ Flared
  - ☐ Streamline

- Gaskets
  - ☐ Compressor
  - ☐ Door
- ☐ Gasket Material
- ☐ Gasket Tackers
- ☐ Goggles
- ☐ Gauges, Service
- ☐ Hardware, Refrigerator
- ☐ Leak Detectors
- ☐ Lapping Compound and Materials
- ☐ Liquid Indicator
- ☐ Lubricating Oils
- ☐ Low Side Float Switches
- ☐ Low water
- ☐ Motors
- ☐ Needles, Float Valve
- ☐ Oil Return

- Packing
  - ☐ Fabric
  - ☐ Metallic
- ☐ Piston Pins
- ☐ Piston Rings
- ☐ Porcelain Refrigerator Cement
- ☐ Pumps, Circulating
- ☐ Receivers

- Recording Instruments
  - ☐ Humidity
  - ☐ Running Time
  - ☐ Temperature

- Refrigerants
  - ☐ Sulphur Dioxide
  - ☐ Methyl Chloride
  - ☐ Carrene
  - ☐ Freon
  - ☐ Iso Butane
  - ☐ Ethyl Chloride

- Refrigerator Dishes
  - ☐ Glass
  - ☐ Porcelain
- ☐ Safety Masks

- ☐ Seals, Shaft
- ☐ Resurfacing Stones
- Strainers
  - ☐ Expansion and Float Valve
  - ☐ Liquid Line
  - ☐ Suction Line

- Switches
  - ☐ Air Temperature
  - ☐ High Pressure Control
  - ☐ Low Pressure Control
  - ☐ Pressure
  - ☐ Temperature
- ☐ Mercury
- Thermostats
  - ☐ Air Temperature (Cooling)
  - ☐ Air Temperature (Heating)
  - ☐ Brine
  - ☐ Domestic Refrigeration
  - ☐ Industrial Refrigeration

- Thermometers
  - ☐ Refrigerator
  - ☐ Test
- ☐ Tool Chests

- Tools
  - ☐ Flaring
  - ☐ Pinchoff
  - ☐ Tube Bender
  - ☐ Tube Cutter
  - ☐ Wrench Sets
- ☐ Trap, Seals
- ☐ Trays, Ice Cube

- Tubing
  - ☐ Copper
  - ☐ Finned
  - ☐ Steel
  - ☐ Tinned
- ☐ Unit Blowers

- Valves
  - ☐ Automatic Expansion
  - ☐ By Pass
  - ☐ Check
  - ☐ Compressor
  - ☐ Expansion
  - ☐ Flapper
  - ☐ Magnetic
  - ☐ Pressure Reducing
  - ☐ Shutoff
  - ☐ Solenoid
  - ☐ Thermostatic Expansion
  - ☐ Two-Temperature
  - ☐ Water
- ☐ Valve Retainers
- ☐ Valve Stems

Write in Names of Products Not Listed

Name .....

Address .....

City and State .....

Business .....

Mail This Page to the

**Refrigeration Service Engineer 433 N. Waller Ave., Chicago, Ill.**

SPEAKING ABOUT *YOUR*

# PISTON RINGS

Silver Seal is the piston ring with the white bearing metal insert. It is too bad that worn compressor cylinders can't be replaced economically—like radio tubes. But that's where this ring is the dark cloud's silver lining. It saves cylinder wear and can be replaced! Silver Seal Rings have been so widely adopted that they have become practically standard in refrigeration.

Silver Seal construction is high quality cast iron with babbitt inserted around the circumference. This bearing metal projects beyond the face surface. It seats quickly, burnishes the cylinder wall and conforms to worn irregularities, giving a more perfect seal and a reduction in piston ring friction. Where rings are subject to high heat, bronze bearing metal inserts should be specified.

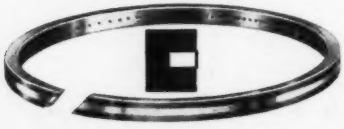
Silver Seal Rings maintain maximum efficiency for a long period of time, reducing running time, lowering power cost and saving wear and tear on the whole machine. Send today for the Silver Seal folder.

Among users of Silver Seal Piston Rings:
FRICK COMPANY
YORK ICE MACHINERY CORPORATION
CREAMERY PACKAGE MANUFACTURING CO.
BAKER ICE MACHINE CO., Inc.

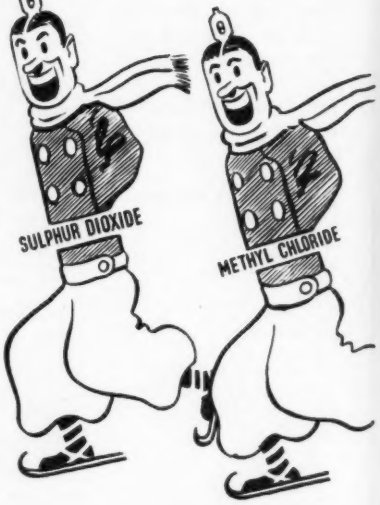
THE SKINNER CHUCK COMPANY
344 Church Street NEW BRITAIN, CONN.

Also manufactured and distributed under license by:
American Hammered Piston Ring Div.
of Koppers Company, BALTIMORE, MD.

"The World's Largest Manufacturer of Industrial Piston Rings"



The ANSUL Twins




PERFECTION of PERFORMANCE

ANSUL CHEMICAL COMPANY
MARINETTE WISCONSIN

**LARGE VALVES STRAINERS and DRYERS**

# HENRY

## SETS THE STANDARD IN AIR CONDITIONING AND REFRIGERATION

No installation is better than its valves, strainers and dryer. Should they fail to give proper service, the efficiency of the entire system is impaired.

Wise indeed is the contractor or service man who standarizes on Henry products. He has learned from experience the value of their many exclusive features. He knows that Henry gives him correct engineering design, far in advance of the field. No matter what the requirements of a particular job may be, he knows that Henry has a size and type best adapted to his needs.

To-day one sees Henry Valves, Strainers and Dryers employed in the Nation's Fleet and in an ever increasing number of refrigeration and air conditioning installations in national and international markets. THAT'S LEADERSHIP.

*Write for the new Henry catalogues*

**HENRY VALVE CO.**

1005-17 North Spaulding Avenue · CHICAGO · ILLINOIS

# A Complete Line for Refrigeration Service

Complete sets of special refrigeration sockets and attachments including ratchet, packed in handy, pocket size metal case.

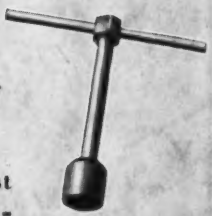
For more than 60 years the Bonney Policy—"The right tool for every job".

Today Bonney offers the most complete line of REFRIGERATION service tools.

Just a few specialized tools for special applications are shown. The full line is complete.

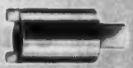
Included also are a full line of standard double-hexagon sockets with handles and attachments, open-end and box wrenches, screw drivers, punches, chisels, pliers, hammers, tube cutters, etc.

Good tools assure good work in the least possible time. Write for complete catalog of Bonney Tools —"The Finest That Money Can Buy" for Refrigeration Service Work.



Special socket wrench for inserting and removing Fedders cartridge type needle seat assembly. Has ⅜" hexagon opening.

Tee handle packing gland nut sockets in various sizes to meet all demands for this type tool.



Packing gland nut sockets for use with ratchet.

Tee handle valve stem sockets in five sizes with sliding cross handle. Openings from ⅜" to ¾".

Valve stem sockets for use with ratchet. Made in four sizes with openings from ½" to ⅞".

Packing nut socket specially designed for Kerotest valve.

## Bonney Forge & Tool Works

ALLENTOWN, PA.

In Canada—Gray-Bonney Tool Co. Ltd., St. Clarens & Royce Aves., Toronto, Ont.

Export Office—38 Pearl St., New York, N. Y.

Stocked by Leading Jobbers Everywhere

Drop-Forged ratchets specially designed for refrigeration service work. Made with 3 different size ratchet openings.

BONNEY TOOLS

Open-end wrenches with double-hexagon openings specially designed for Flare nut adjustments.

*The Finest That Money Can Buy*